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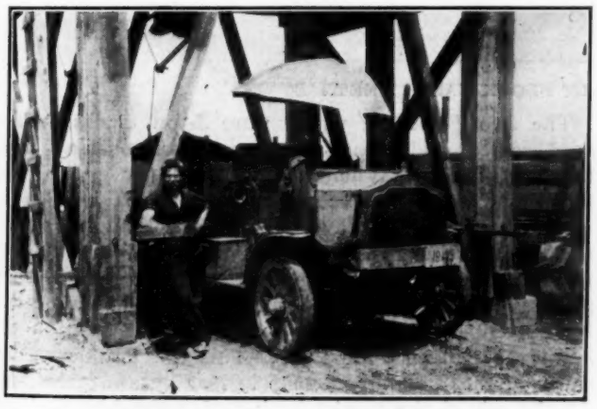
MOTOR TRUCKS IN STATE ROAD WORK

Resurfacing Heavy Traffic Road With Two-Inch Asphalt Blocks—Hillside Brick Used on the Heavy Grades—Cost and Economy of Motor Trucks on a Seven to Nine Mile Haul

Owing to the heavy and fast automobile traffic on the oiled macadam road from Tarrytown to White Plains, New York, maintenance charges on this road mounted so high in 1913, 1914 and 1915 that the New York State Highway Department decided it would be economical to lay a more durable pavement on this section. A 2-inch asphalt block pavement, 16 feet wide, on a 5-inch concrete base, with hillside brick for the heavier grades, was decided upon and the contract was awarded to Molloy & Murray of Yonkers, N. Y., the builders of the original road.

The road lies entirely in Westchester County, one of the richest in the state, and the town of Greenburgh, the wealthiest town in the state, and passes through the village of Elmsford. The town decided to have the width of the road increased to 20 feet at its expense, and for this added width paid $12,000, bringing the total amount of the contract to $110,000. The village of Elmsford, however, refused to pay the additional amount, and the road is, therefore, being constructed 20 feet wide except through the village, where it is but 16 feet in width.



MOTOR TRUCK LOADING FROM BIN.

UNLOADING SAND FOR MORTAR CUSHION.

In preparing the old road for the new surface and base, some grading was, of course, necessary. The old wearing course, which was about three inches thick, was removed and in the center, owing to the rather high crown, about 2 inches more had to be taken off in order to bring the subgrade parallel to the surface of the new pavement. The bottom course of the old macadam was in good condition and furnished an excellent foundation for the concrete base of the new pavement.

Grading was done entirely by hand, since there was none heavy enough to warrant a steam shovel or other similar machinery. To loosen the road surface, a Porcupine scarifier and a rooter plow, drawn by a Buffalo Pitt steam roller, were used. The wheels of the roller were equipped with spikes which served the double purpose of giving traction and of further loosening the road surface. The rough grading gang, following the scarifier, cut down the road to approximate grade and loaded the excess materials into wagons. This excavated material, mostly broken stone, was used later for constructing shoulders. The fine grading gang in the rear brought the subgrade to the proper elevation and shape. It was then rolled thoroughly.

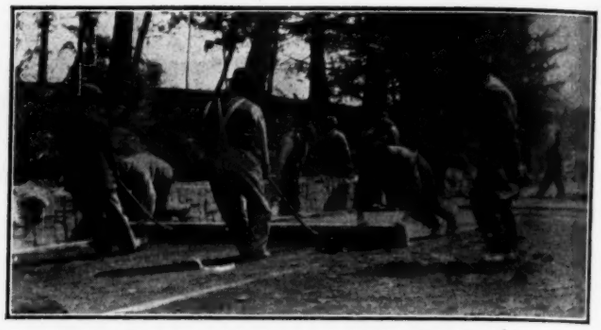
The concrete base has a uniform thickness of 5 inches, the center and sides being the same, and is given a crown of 2½ inches for the 16-foot and 3 inches for the 20-foot road. The curbs are built integral with and 3 inches higher than the base where the 2-inch asphalt blocks are used and 6½ inches higher than the base where the hillside brick are used, and are 6 inches thick. Alsen Portland cement, sand and gravel are mixed in the proportions of 1:2½:5 for the base and the curbs. Blaw steel forms, secured with iron stakes, are used throughout. There are two Koehring mixers on the job, but only one is being used, as this lays enough base to keep ahead of the rest of the work.

The blocks are laid on a mortar bed of cement and clean, sharp sand mixed 1:4. A board template, the ends of which ride on the curbs (or on planks where the road is too wide), is used to give the proper section, and on the surface thus prepared the asphalt blocks are laid, the mortar bed being thoroughly sprinkled with water just in advance of the laying. Barber Asphalt Paving

Company 2-inch asphalt blocks are used. Every fifteenth row is composed of anchor blocks which have set into the lower face a steel anchor which projects about half an inch into the mortar bed. This is designed to prevent the pavement from sliding under traffic. On the heavier grades Toronto hillside brick are used.

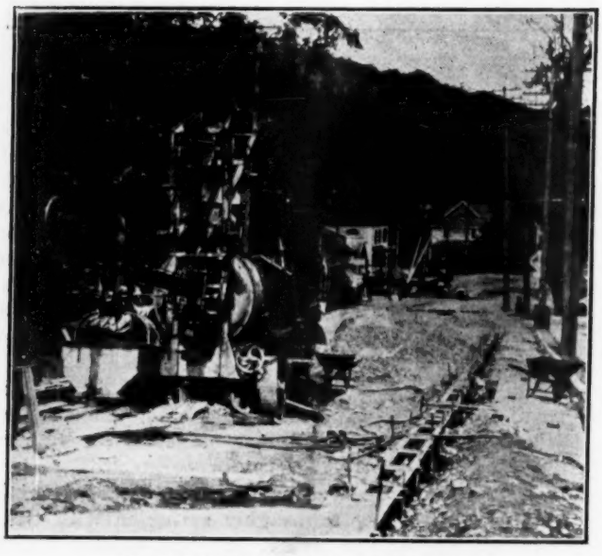
In the actual work of laying the blocks, four pavers are employed, two of whom start and end rows and lay the header rows parallel to and along the curbs. There are five helpers, three or four of these being employed in carrying the blocks from the piles along the side of the road and placing them within easy reach of the pavers. Three blocks are usually carried at one time. In the whole bedding and laying party are four pavers, three men mixing mortar (this is done by hand), three men preparing the mortar bed, five helpers and a foreman. This force will lay 250 to 300 feet of 16-foot road per day. This requires about 10,000 to 12,000 blocks, which measure 5 inches by 12 inches and weigh 9½ pounds each. The finished pavement is covered lightly with sand which is broomed carefully into the joints. Especial care is taken to secure sharp and clean sand for this work.

With the exception of short-distance hauling, such as local supplies and excavated material, all transportation is by motor truck. The sand and gravel are sent by barge down the Hudson river from Newburgh to a wharf near Tarrytown, where it is unloaded by clam-shell buckets into elevated bins, whence it is loaded by gravity into the trucks. A contract was made with a local firm to haul the sand and gravel for the base from the wharf to the work, while two motor trucks belonging to the contractors (a pair of 1912 Packards, bought second-hand by the contractors three years ago and in regular service since) were intended to haul the asphalt blocks and the sand and cement for the mortar bed; but the local firm was unable to secure enough motor trucks to keep an adequate supply of sand and gravel on hand and the Packards were at times pressed into this service. Other trucks were hired when it was possible and on July 4, when many were available, 16 were at work.



USING TEMPLATE TO SURFACE CUSHION.

WHERE BRICK AND ASPHALT BLOCK BASES MEET.



CURB FORMS AND CONCRETE MIXER.

The two Packards, which were 3-ton trucks, hauled sand, cement and asphalt blocks regularly over a 7 to 9-mile round trip. When hauling sand (or gravel), the usual load was 3½ cubic yards, or about 4½ tons, as the sand was wet and heavy. The road, though upgrade almost all the way from the wharf to the work, was very good and the trucks averaged rather better than 50 miles per day. The schedule on sand and gravel hauling called for six trips on the 9-mile route or eight trips on the 7-mile haul in an 8-hour day. This was practicable because of the economy of time in loading and unloading. At the wharf the trucks back under the bins and are loaded by the driver by opening a chute, so that the total time consumed is not more than three minutes. No helper is carried. Arrangements have been made with the coal company owning the wharf to keep the bins full. At the other end of the run the trucks, which are fitted with hinged sides and an inverted V bottom to make the material dump easily, unload and are away again in less than 8 minutes, including the time consumed in turning. Two men with shovels help unload the sand, as it is wet and does not dump cleanly.

In hauling cement, owing to the time required to load and unload, all of which is done by hand, only six or seven trips are made on the 7-mile haul. The usual load is about 4 tons.

The greatest chance for lost time comes in the asphalt block hauling, owing to the care necessary in handling these. It is not possible to dump or throw the blocks, due to the danger of chipping or breaking, and the weight —9½ pounds each—makes them difficult to handle in bunches of more than 4 or 5 at a time. The trucks were

loaded directly from the scow, 8 to 10 men being employed. In advance of the arrival of the truck, the men arranged the blocks in piles of 4 or 5, placing them convenient for loading. By means of a gang plank laid from the scow to the truck, the men could load 900 to 1,000 blocks in 15 minutes. This load, weighing 4 to 5 tons, was handled easily on the good roads. At the unloading end six men were required, two passing the blocks out to the others, who piled them along the road. The average time of unloading was 12 minutes.

In hiring extra trucks for hauling sand and gravel or asphalt blocks, prices were paid according to the ability of the truck to handle material, the smaller and slower trucks being paid less. For instance, a 5-ton truck with dumping attachments was paid $30 per day; without the dumping attachments, $25 per day. The former hauled sand and gravel; the latter hauled asphalt blocks. Every truck was supposed to make 50 to 55 miles per day on the sand and gravel or 40 miles per day on the asphalt block hauling. For a 5-ton truck the standard load was 4 yards of sand or gravel or 1,000 asphalt blocks.

Assuming 55 miles per day hauling sand or gravel and $30 per day for the truck, the cost was 27.6 cents per cubic yard per mile or, assuming an average yard to weigh 2,500 pounds, 22.2 cents per ton mile. For smaller trucks the cost was slightly greater. For the asphalt blocks, where six trips with 1,000 blocks each trip was made per day, the cost was $4.16 per thousand.

These costs are for hired motor trucks. With those owned by the contractor, the figures are considerably less. These two trucks have been in service four years and the contractors no longer charge depreciation against them. They estimate the actual daily running costs to be:

Driver, per day	$3.50
Oil	.35
18 gallons of gasoline	4.65
Tires, per day	2.50
Repairs and garage	2.50
Total	$13.50

Adding to this a depreciation charge of $3 per day and $2 for interest and insurance, the total cost per day is about $18.50. Carrying aggregate, the trucks move 3½ yards (4.4 tons) each per trip. The daily mileage is about 55 and the ton-miles 120, which makes the cost per ton-mile 15.4 cents and per yard-mile 19.4 cents. For hauling asphalt blocks, the cost, assuming that 6,000 are carried per day, is $3.08 per thousand.

If horses had been used, the costs would have been much greater. Teams were $6 per day and would make only two trips per day. (Seven years ago, when the same contractors built the original road, teams made three trips a day; but this need not be considered, as teams carrying a heavy load cannot ordinarily travel over 15 miles per day, and certainly could not make more than that distance in the present 8-hour day.) Making two trips per day with a load of 1½ yards, the hauling cost is $2 per yard delivered, as against 90 cents a yard for the 9-mile haul and 66 cents a yard for the 7-mile haul by the contractors' trucks, and $1.25 and 96 cents for the hired trucks on the 9 and 7-mile hauls respectively.

The work is being done by Molloy & Murray of Yonkers, N. Y., with Herman Boettjer as engineer in charge, under B. H. Wait, division engineer at Poughkeepsie, N. Y.

STORAGE BIN AT TARRYTOWN WHARF.

A SEWER SYSTEM WITHOUT MANHOLES OR RECORDS.

By C. E. HENDERSON, City Engineer.

Previous to 1915, at which time the Commission-Manager form of government went into operation, the city of St. Augustine, Fla., had made only spasmodic efforts at retaining the services of a city engineer. It was customary to retain the services of an outside firm to do the engineering work, and the yearly average paid on such work would have nearly paid the salary of a good engineer. While not wishing to depreciate the work of some of those employed by this hit-and-miss plan, yet the results to the city obtained by this method cannot be compared with the results if a permanent engineer is employed. The permanent engineer has time and opportunity to gather information, study conditions and work toward a general plan. Better permanent records will also be left.

When the writer became city engineer of St. Augustine in October, 1915, he found that the storm sewers were not doing the work that should be expected of them. The water would stand over some of the catch-basins for nearly a day after a rain. There were only three manholes to be found on six miles of storm sewers, and the only plan to be found was one owned by the Florida East Coast Hotel Co., showing approximate location of a number of services which that company had constructed, some as early as 1887.

The sewer grades must necessarily be very slight, for the ground is very flat and there is scarcely a place ten feet above mean sea level. Notwithstanding this very flat grade, no attempt had ever been made to clean the sewers, except occasionally to flush with a fire hose, although a large per cent had been in the ground over 25 years.

Manhole and catch-basin castings and a sewer clean-

ing machine were purchased and the work of constructing manholes for the purpose of cleaning the sewers for a first time was begun in December, 1915.

The sewer cleaning was done with a "Stewart" sewer cleaning machine, which consists essentially of two windlasses, two steel cables and drag buckets of various sizes to suit the pipe. The buckets are shallower at the back that at the front or cutting edge, and so constructed that when dragged back into the pipe they will slide up on the dirt and when dropped forward will dig into it.

Sewer rods are first run between two adjoining manholes and by means of these the end of one cable dragged through. With a windlass over each manhole and two cables attached to opposite ends of the bucket, the latter is drawn backward into the sewer for a short distance, then pulled forward to the manhole from which it entered the pipe, drawing the material out. This operation is repeated, going back farther each time for a bucket load, until the bucket has worked back to the further manhole. In a number of cases where the pipe was practically full of dirt, it was necessary to work a small bucket, say a four-inch, through first; then an eight-inch, and finally a twelve-inch for a twelve-inch pipe.

Three men were usually used on the machine: one on the windlass to drag the bucket in, and two on the other windlass, to drag the bucket and material out. These men cleaned from 40 feet to 300 feet per day, depending mainly on amount of material in the pipe.

Much difficulty was experienced in most of the sections in running the rods through the sewers and in nearly every case it was necessary to flush the sewer to aid the rods. All the sewers were found to contain large quantities of dirt and occasionally large chunks of roots. One twelve-inch sewer in a prominent street, close to the business and hotel district, was 95 per cent full of dirt.

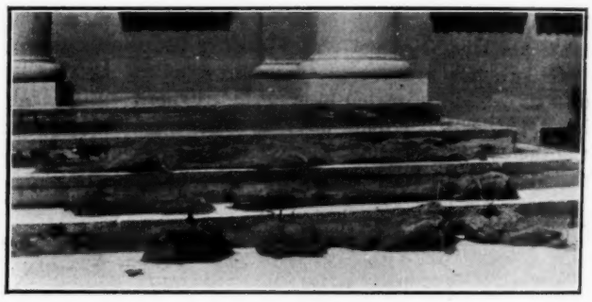
In one instance two 12-inch and one 8-inch sewers emptied into a 10-inch trunk. This trunk as well as some other sewers had an up grade toward the outlet. In two other cases one 12-inch pipe formed the outlet for two 12-inch pipes, all on about the same grade.

The Valencia Street sewer was shown by the F. E. C. Hotel Co. plan to run through the railroad yards and empty into the San Sebastian river near the railroad bridge. A thorough search for the outlet revealed nothing until a foreman was found who had been around the yards for a number of years. He went to a point about fifty feet back from the present shore line and said that the end of the pipe was under the place where he stood. The end of the pipe was found buried under rubbish five feet deep.

The process of cleaning the sewers revealed obstructions in the pipe. In several cases pipes of various sizes crossed through the sewer. One 4-inch gas main crossed through the center of a 12-inch sewer. One 6-inch lateral from a catch-basin extended four inches into the 8-inch main with which it connected. At one point a sharp reverse curve was made by two ⅛ bends. There was no apparent cause for this freak.

About 150 manholes have been constructed and most of the sewers have been cleaned. When the work of constructing manholes was begun there was adverse criticism, for it was considered useless expense. Now that the former critics have seen the results of the work they have changed opinions. As one expressed it, "Where it formerly required hours for the water to get away, it now requires only minutes. The sewers are as good as new at a fraction of the cost of constructing new sewers."

In the accompanying illustration is shown a six-months growth of elm roots taken from a 12-inch storm sewer. All were taken from a length of about thirty feet. The section of storm sewer from which these roots were taken was thoroughly cleaned in December, 1915. Recently after a heavy rain it was noticed that the water did not get away from this section properly. Upon investigation the trouble proved to be roots, most of which were raked out, and the balance were removed by the machine.



SIX MONTHS' GROWTH OF ROOTS FROM A 12-INCH STORM SEWER.

This sewer, which was constructed about six years ago, was not laid to a true grade, there being a rise toward the outlet sufficient to hold water the full depth of the pipe at the affected part. This has been an exceptionally dry season and has caused the roots to search the sewers vigorously for water.

Fortunately, there is another storm sewer across the street, low enough that, by laying a cross connection, the defective sewer can be thoroughly drained, thus removing the constant water supply which gave the roots such rapid growth.

STERILIZING WATER AND CLEANING MAINS

Information From Several Hundred Cities Concerning Methods Used by Them for Reducing Bacterial Content—Corrosion of Water Mains and Methods of Removing Same.

In connection with the information concerning their water works furnished by more than six hundred officials and published in our June 1st issue, these officials also answered the questions: "Is the capacity of your mains diminished by corrosion?" "Do you clean them?" "If so, how and how often?" "Do you sterilize the water?" "If so, by what process?" Their answers are given in the table on the following pages.

These answers are given as furnished, and no attempt made to change them with a view to uniformity. For instance, some report sterilizing by "liquid chlorine," others by "chlorine gas," and some by "chlorine"; but we suppose that all refer to the same treatment. Also "hypochlorite," "chloride of lime" and "bleach," all probably refer to the same material.

In the answers concerning cleaning mains, quite a number report doing this by flushing or blowing out. This is generally believed to remove only sediment deposited in the mains, mostly that brought into them by the water, and to have no effect upon tuberculation or corrosion. A few, however, report "cleaning," which refers in probably all cases to the actual removal by some application of force of tuberculation or other incrustation on the pipes.

It is interesting to note that, of the cities reporting, 96 employ some sterilizing agent, 53 of these using liquid chlorine, which is the latest form of applying chlorine for sterilizing purposes but from these figures appears to have become undoubtedly the most popular. The use of liquid chlorine or hypochlorite is reported from 33 states scattered over the entire country; and it is known that several cities use one or the other which failed to report it, some probably because of local popular prejudice against putting "chemicals" in the water supply.

CLEANING MAINS AND STERILIZING WATER.

City—	Is the capacity of your mains diminished by corrosion?	Do you clean them?	How and how often?	Do you sterilize water?	By what process?
Alabama:					
Jacksonville	Yes	Yes	Taking up	No	.....
Selma	Yes	Yes	By Nat'l. W. Main Clean. Co.	No	.....
Talladega	No	No	.....	Yes	Bleach
Arkansas:					
El Dorado	No	Yes	Flushing bi-monthly	No	.....
Fordyce	No	Yes	Flushing monthly	....	.....
Fort Smith	Yes	No	.....	....	.....
California:					
Riverside	Yes	No	.....	No	.....
Sacramento	Slightly	....	Blowing out hydrants quarterly	Yes	Liquid Chlorine
Santa Monica	Slightly	No	.....	No	.....
Stockton	No	Yes	Flushed yearly	No	.....
Colorado:					
Colorado Spgs.	Very little	Yes	Flush quarterly	No	.....
Greeley	Very little	No	.....	No	.....
Connecticut.					
Danbury	Some	No	.....	No	.....
E. Hartford	No	Yes	Flushing	No	.....
Hartford	Yes	....	Cleaned 3 years ago	Yes	Liquid Chlorine
New Britain	No	Yes	Flush 3 times a year	No	.....
New Haven	Some	Not as a rule	.....	Yes	Liquid Chlorine
Putnam	Yes	No	.....	....	.....
Southington	Some	....	.....	No	.....
Wallingford	Slightly	No	.....	....	.....
Watertown	.....	Yes	Flush semi-annually	No	.....
Windsor	No	Yes	Flush yearly	No	.....
Delaware:					
Dover	Very little	No	.....	No	.....
Florida:					
Daytona	Not appreciably	Yes	Flush semi-annually	....	.....
Lake City	Some	No	Flush	No	.....
Live Oak	No	No	.....	Yes	Chlorine Gas
Orlando	Slightly	No	.....	No	.....
Palatka	No	No	Flush hydrants monthly	....	.....
Pensacola	Not much	No	.....	No	.....
Plant City	Not noticeably	Yes	Flushing monthly	No	.....
Starke	Some	No	.....	No	.....
Georgia:					
Americus	Very little	Never	.....	No	.....
Athens	No	No	.....	Yes	Liquid Chlorine
Atlanta	Sometimes	No	.....	No	.....
Decatur	Slightly	Yes	Blow out monthly	....	.....
La Grange	No	No	.....	Yes	Liquid Chlorine
Milledgeville	No	Yes	Flush quarterly	Yes	Chloride of Lime
Thomasville	Slightly	No	.....	No	.....
Idaho:					
Weiser	Not appreciably	....	Flush yearly	Yes	Chloride of lime
Illinois:					
Decatur	No	Yes	Flush hydrants annually	Yes	Hypochlorite
Farmington	No	Yes	Flushing 3 times a year	No	.....
Galesburg	Not badly	....	Flush when can spare water	Yes	Hypochlorite
Joliet	Yes	No	.....	No	.....
Lewiston	Very little	No	.....	No	.....
Lincoln	No	Yes	Flushing 3 times a year	No	.....
Metropolis	Slightly	No	.....	No	.....
Mt. Carmel	Think so	No	Flush at intervals	....	.....
Mt. Olive	Yes	Yes	Flushing several times a year	No	.....
Napierville	Think not	No	.....	No	.....
Olney	Yes	No	.....	No	.....
Streator	No	Yes	Blow hydrants semi-annually	Yes	Chlorine gas
Indiana:					
Batesville	Don't know	Yes	Flush semi-annually	No	.....
Bedford	No	No	.....	Yes	Hypochlorite
Brazil	Probably	No	.....	No	No
Elwood	No	....	Flush monthly	No	No
Evansville	Yes, in old lines	Yes	Flush annually	Yes	Hypochlorite
Fairmount	Some	No	.....	No	.....
Huntington	Very little	No	Flush about quarterly	No	.....
Jeffersonville	Don't know	No	Flush	No	.....
Lebanon	.....	....	.....	No	.....
Logansport	Not much	Yes	Flush 3 or 4 times a week	Yes	Liquid Chlorine
Mishawaka	No	Yes	Flush quarterly	No	.....
Montpelier	Not much	No	.....	No	.....
New Castle	No	Yes	Flush yearly	No	.....
Peru	No	Yes	Quarterly	No	.....
Rushville	Very little	No	Flush semi-annually	No	.....
Seymour	No	No	.....	Yes	Hypochlorite
South Bend	Slightly	Yes	Flush annually	No	.....
Terre Haute	No	No	Flush semi-annually	Yes	Gas and hypochlorite
Washington	No	No	.....	Yes	Hypochlorite
West Lafayette	No	Yes	Flushing	....	.....
Iowa:					
Atlantic	Yes	Yes	Flush monthly	No	.....
Belle Plain	Some	No	.....	No	.....
Boone	Some	Yes	Flush semi-annually	Yes	Hypochlorite
Burlington	No	No	Flush annually	Yes	Liquid Chlorine
Cedar Rapids	No	No	.....	Yes	Hypochlorite
Charles City	Very little	No	Flush semi-annually	No	.....
Cherokee	Not much	No	.....	No	.....
Creston	No	No	.....	Yes	Liquid Chlorine
Des Moines	No	No	.....	Yes	Liquid Chlorine
Glenwood	No	No	Flush monthly	No	.....
Harlan	Not much	No	.....	No	.....
Marshalltown	No	Yes	Flush semi-annually	No	.....

CLEANING MAINS AND STERILIZING WATER (Continued).

City—	Is the capacity of your mains diminished by corrosion?	Do you clean them?	How and how often?	Do you sterilize water?	By what process?
Iowa (Continued):					
Missouri Valley....	Not noticeable	No	.....	No	.....
Webster City.....	Yes	No	Will clean in near future	No	.....
Winterest	Some	....	Monthly	No	.....
Kansas:					
Caney	Some	No	.....	No	.....
Garden City.....	Probably	No	.....	No	.....
Girard	Very little	No	.....	No	.....
Hiawatha	Not noticeable	No	.....	No	.....
Horton	No	....	Flush semi-annually	....	.....
Independence	Not much	Yes	Flush 3 or 4 times a year	No	.....
Manhattan	Slightly	No	Continued flushing	No	.....
Neodesha	No	No	.....	Yes	Hypochlorite
Osage City.....	No	Yes	Flush semi-annually	....	.....
Osawatomie	Don't know	No	.....	Yes	Chemicals
Parsons	Not much	Yes	Flush weekly and monthly	....	.....
Pittsburg	Slightly	No	.....	No	.....
Kentucky:					
Earlington	Some	No	.....	No	.....
Hopkinsville	Some	Yes	Flush 5 or 6 times a year	No	.....
Lexington	No	....	.....	Yes	Hypochlorite
Paris	No	....	Flushing	....	.....
Princeton	No	Yes	Flush semi-annually	....	.....
Louisiana.					
Lafayette	No	Yes	Twice a year	No	.....
Natchitoches	No	Yes	Flushing monthly	No	.....
New Iberia.....	Not appreciably	Yes	By flushing	No	.....
Maine:					
Augusta	Slightly	No	.....	No	.....
Bath	Not noticeable	....	.....	....	.....
Farmington	Slightly	No	.....	No	.....
Maryland:					
Baltimore	Not appreciably	Yes	Flush as required	....	.....
Chestertown	Yes	No	.....	Yes	Hypochlorite
Frederick	No	No	.....	Yes	Chlorine gas
Massachusetts:					
Cohasset	..	Yes	Flush	....	.....
Concord	Some	No	.....	No	.....
Falmouth	..	....	Flushing frequently	No	.....
Fitchburg	Some	No	.....	No	.....
Framingham	Some	Not yet	.....	No	.....
Lowell	No	No	Flushing	No	.....
New Bedford.....	Apparently not	Yes	Flush several times yearly	....	.....
Northampton	Probably	No	.....	No	.....
Orange	No	Yes	Flush semi-annually	No	.....
Springfield	Probably	No	.....	....	.....
Taunton	Not much	No	.....	No	.....
Webster	Not much	No	.....	No	.....
Wellesley	Some	No	.....	No	.....
Williamstown	Not much	No	.....	No	.....
Worcester	Very little	....	Flush	No	.....
Michigan:					
Alma	..	....	.....	No	.....
Boyne City	No	Not yet	.....	No	.....
Houghton	No	Yes	Annually	No	.....
Ludington	No	No	.....	Yes	Hypochlorite
Marquette	No	No	.....	At times	Hypochlorite
Niles	Not particularly	....	.....	No	.....
Norway	No	Yes	Flush	Yes	Hypochlorite
Paw Paw.....	Slightly	Yes	Flush quarterly	No	.....
Red Jacket.....	By sand, yes	Yes	Flushing every 2 or 3 years	No	.....
So. Haven.....	Some	No	.....	Yes	Chlorine
Traverse City.....	No	No	.....	Yes	Hypochlorite
Yale	Don't know	No	Flushing	No	.....
Minnesota:					
Chisholm	Not appreciably	No	.....	Yes	Chlorine gas
Duluth	No	No	.....	Yes	Liquid Chlorine
Lake City.....	No	Yes	Flush quarterly	No	.....
Mankato	No	No	Flush	No	.....
Melrose	No	Yes	Flushing bi-monthly	No	.....
Minneapolis	No	No	.....	Yes	Liquid Chlorine
Owatonna	No	No	Flush 3 times yearly	No	.....
Stillwater	No	....	Flush monthly and yearly	....	.....
Two Harbors.....	No	....	.....	Yes	Hypochlorite
Mississippi:					
Clarksdale	No	No	Flush	No	.....
Jackson	A few old pipes	No	.....	....	.....
Natchez	Yes	No	.....	No	.....
Water Valley.....	Some	No	Will clean soon	No	.....
Missouri:					
Brookfield	No	No	.....	Yes	Hypochlorite
Cape Girardeau.....	Very little	No	.....	Yes	Hypochlorite
Carrollton	Yes	Yes	Last year; once in 20 years	No	.....
Fulton	Not much	No	.....	No	.....
Higginsville	Don't know	No	.....	No	.....
Washington	Some 4-inch	Not yet	.....	....	.....
Montana:					
Billings	Not much	No	.....	Yes	Chlorine gas
Glendive	Very little	No	.....	Yes	Hypochlorite
Kalispell	Some	....	Flushing	No	.....
Nebraska:					
Aurora	Yes	No	May soon; never have	No	.....
Hastings	Not apparent	No	.....	No	.....
New Hampshire.					
Berlin	..	No	.....	Yes	Chlorine solution
Dover	Think not	No	.....	....	.....
Keene	Yes	....	Flushing	No	.....
Lebanon	Slightly	No	.....	....	.....
Newport	Not perceptibly	No	.....	No	.....
New Jersey					
Bridgeton	Very little	No	.....	Yes	Chlorine gas
Burlington	No	....	Flush quarterly	....	.....
Jersey City	Some	Yes	Porcupine scraper 10 years ago	Yes	Liquid Chlorine
Milltown	Not yet	Yes	Flush	No	.....
Newton	No	....	.....	No	.....
Rahway	Not much	No	.....	Yes	Chlorine gas

CLEANING MAINS AND STERILIZING WATER (Continued).

City—	Is the capacity of your mains diminished by corrosion?	Do you clean them?	How and how often?	Do you sterilize water?	By what process?
New Jersey (Cont.):					
Ridgewood	..	No	.....	Yes	Hypochlorite
Trenton	Yes	Yes	Scraping	Yes	Liquid Chlorine
West Orange	No	No	.....	Yes	Liquid Chlorine
New York:					
Beacon	Very little	Yes	Flushing semi-annually	Yes	Chlorine gas
Brooklyn	Yes	Yes	.....	Yes	Chlorine gas
Corning	No	No	.....	Yes	Chlorine gas
Dansville	..	....	Flushing	No	.....
Elmira	Not perceptibly	Yes	A few times	Yes	Liquid Chlorine
Hornell	No	....	.....	Yes	Chlorine
Johnstown	No	....	Flushing	No	.....
Little Falls	..	Not yet	.....	....	.....
Mt. Vernon	Some	No	.....	Yes	Liquid Chlorine
Newburgh	Yes	No	.....	No	.....
Ossining	Think not	No	.....	Yes	Liquid Chlorine
Oswego	No	Yes	Flush frequently	Yes	.....
Plattsburgh	No	No	Flushing	Yes	Liquid Chlorine
Port Jervis	Some	No	.....	No	.....
Poughkeepsie	Some	No	.....	Yes	Liquid Chlorine
Sidney	Not yet	Yes	Several times yearly	....	.....
Solvay	Not noticeably	....	.....	Yes	Chlorine gas
Tarrytown	Probably	....	Flush quarterly	Yes	Liquid Chlorine
Tonawanda	Think not	Yes	Flush	No	.....
Waterloo	Slightly	No	May clean	Yes	Hypochlorite
Waverly	Not much	No	.....	No	.....
North Carolina:					
Gastonia	..	....	.....	Partly	Hypochlorite
Oxford	Slightly	....	Flush semi-annually	No	.....
Rocky Mount	No	No	Flushing	Yes	Hypochlorite
Wilmington	Very little	No	.....	Yes	Liquid Chlorine
North Dakota:					
Fargo	No	No	Flushing	Yes	Hypochlorite
Wahpeton	Not much	....	.....	Yes	Hypochlorite
Williston	No	No	.....	Yes	Roberts
Ohio:					
Barnesville	Not much	No	.....	Yes	.....
Cleveland	Very little	....	Flushing	Yes	Chlorine
Columbus	Not much	No	Flushing	....	.....
Conneaut	No	Yes	Flushing annually	No	.....
Cuyahoga Falls	Not noticeable	Yes	Flush semi-annually	....	.....
Hamilton	Yes	No	Flush only	No	.....
Huron	No	No	.....	Yes	.....
Kent	Very little	No	.....	No	.....
Logan	Probably	Yes	Flush quarterly	No	.....
Marietta	Yes	No	.....	....	.....
Massillon	No	Yes	Flushing	No	.....
Niles	No	No	.....	Yes	Liquid Chlorine
St. Marys	Very little	No	.....	No	.....
Sandusky	Very little	No	.....	No	.....
Sidney	No	Yes	Flush semi-annually	No	.....
Toledo	No	Not required	.....	Yes	Hypochlorite
Toronto	One line	Not yet	.....	No	.....
Troy	No	Yes	Flush 3 times yearly	No	.....
Warren	No	Yes	Flush semi-annually	Yes	Hypochlorite
Wauseon	Not noticeably	No	.....	No	.....
Oklahoma:					
Chickasha	Small per cent.	No	.....	Yes	Chlorine
Clinton	No	Yes	Flushing	....	.....
Guthrie	Not much	No	.....	No	.....
Kingfisher	Some	No	.....	....	.....
McAlester	Some	....	Flush	....	.....
Oregon.					
Eugene	No	No	Flush monthly	Yes	Hypochlorite
Medford	No	....	Flush	No	.....
The Dalles	....	Yes	Flush annually	No	.....
Pennsylvania:					
Allentown	No	No	.....	Yes	Chlorine
Barnesboro	No	Yes	Flush	No	.....
Carbondale	Very slight	No	.....	Yes	Chlorine gas
Catasauqua	No	Yes	Flush	No	.....
Chambersburg	Very little	No	.....	No	.....
Chester	No	No	.....	Yes	Chlorine gas
Emporium	No	Yes	Flush quarterly	No	.....
Franklin	Not much	No	Flush quarterly	Yes	Hypochlorite
Gettysburg	Some slightly	Yes	When needed	Yes	Hypochlorite
Greensburg (& vic.)	No	No	.....	Contract awarded	
Harrisburg	Not much	No	.....	No	.....
Indiana	More or less	Yes	By Nat. W. M. Clg. Co. last year	....	.....
Juniata	Yes	No	.....	No	.....
Lehighton	No	....	Flush 4 to 6 times a year	No	.....
Media	No	No	.....	Yes	Liquid Chlorine
Meyersdale	Very slight	Yes	Flush quarterly	No	.....
Minersville	....	Yes	.....	No	.....
Norristown	Old pipe	No	New pipes laid	Yes	Chlorine
Pittsburgh	In old mains	Yes	Last cleaned in 1912	Yes	Liquid Chlorine
Reading	Some	Yes	Scraping	No	.....
Ridgway	Yes	No	.....	....	.....
Sayre	....	....	.....	Yes	Hypochlorite
Sewickley	Some	No	.....	No	.....
Steelton	No	Yes	Flush monthly	....	.....
Susquehanna	Some	Yes	Flush	....	.....
Titusville	No	Yes	Flush	No	.....
West Newton	No	Yes	Flush annually	No	.....
Wilkinsburg	Not much	No	.....	Yes	Hypochlorite
Rhode Island:					
Bristol	Very little	No	.....	....	.....
Providence	Not much	No	.....	No	.....
Westerly	Think not	....	Flushing only	No	.....
Woonsocket	Old and small pipe	No	.....	No	.....
South Carolina:					
Camden	Yes	No	.....	In summer, hypochlorite	
Columbia	Some old ones	Yes	8 years ago by Natl. W. M. Clean. Co.	Yes	Liquid Chlorine
Florence	Very slightly	No	.....	No	.....
Orangeburg	No	Yes	Flush often	....	.....

CLEANING MAINS AND STERILIZING WATER (Continued).

City—	Is the capacity of your mains diminished by corrosion?	Do you clean them?	How and how often?	Do you sterilize water?	By what process?
South Dakota:					
Mitchell	Slightly	No	.....	No	.....
Watertown	No	Yes	Flush semi-annually	No	.....
Tennessee:					
Clarksville	Yes	No	.....	....	.....
Dyersburg	Some	No	Not necessary	....	.....
Johnson City	No	No	.....	No	.....
Memphis	No	No	Flush semi-annually	No	.....
Paris	Yes	No	.....	Yes	Hypochlorite
Tullahoma	Very slight	No	.....	No	.....
Texas:					
Austin	Very little	No	.....	....	.....
Crockett	No	Yes	Flush monthly	....	.....
Dublin	Not apparent	Yes	Flush yearly	No	.....
Longview	Not much	No	.....	Yes	Hypochlorite
Plainview	Think not	No	.....	No	.....
Seguin	Yes	....	Flush	No	.....
Vernon	A little	No	.....	No	.....
Vermont:					
Barre	Not much	....	Flush semi-annually	No	.....
Bennington	No	No	Flush several times yearly	No	.....
Fair Haven	Some	No	.....	No	.....
Northfield	Not noticeable	....	Flushed semi-annually	No	.....
Waterbury	10 per cent	No	.....	No	.....
Virginia:					
Bedford	Not noticeably	Yes	Flush	....	.....
Martinsville	No	....	.....	Yes	Chlorine
Winchester	No	No	.....	Yes	Liquid Chlorine
Washington:					
Bellingham		Yes	Flush monthly	No	.....
Dayton	No	Yes	Flush 4 or 5 times yearly	Yes	Chlorine gas
Pullman	No	....	Flush yearly	No	.....
Snohomish	No	Yes	Flush semi-annually	No	.....
Tacoma	No	Yes	.....	Yes	Chlorine gas
Walla Walla	No	No	.....	At times	Hypochlorite
West Virginia.					
Clarksburg	Think 4-in. reduc'g	No	.....	Yes	Hypochlorite
Mannington	Yes	Yes	Recently and 3 years ago	No	.....
Martinsburg	No	No	.....	Yes	Hypochlorite
Moundsville	Very little	No	Never have	No	.....
Sisterville	Slightly	....	Flushed monthly	No	.....
Wisconsin:					
Antigo	No	Yes	Flush monthly	No	.....
Eau Claire	Yes	No	.....	No	.....
La Crosse	No	Yes	Flush dead ends quarterly	No	.....
Lake Geneva	No	....	Clean semi-annually	No	.....
Madison	Probably	....	Flush	No	.....
Milwaukee	No	No	.....	Yes	Liquid Chlorine
New London	No	Yes	Just cleaned	....	.....
Port Washington	Some	No	.....	No	.....
Sparta	Some	No	.....	No	.....
Two Rivers	Some	No	.....	Yes	Chlorine
Wyoming:					
Cheyenne	No	No	.....	Yes	Chlorine gas

LOS ANGELES MOTOR SPRINKLER AND FLUSHER.

Tests were conducted in the city of Los Angeles, Cal., during almost a year to determine the relative economy of motor-driven and animal-drawn equipment for street cleaning and sprinkling, resulting in the adoption of the former. It was found that one horse-drawn wagon would sprinkle five miles of street a day at a cost of $4.50, while the motor sprinkling and flushing truck tried sprinkled nearly 30 miles in eight hours at a total cost of $14.71. The truck was really operated for two shifts, sprinkling for eight hours during the day and flushing for eight hours at night. The cost of operating a horse-drawn flusher was $5 for driver and team and an estimated depreciation of $1.00; and it required six teams to cover the same territory as one truck. In the two shifts, therefore, the truck did at a cost of $29.42 work which cost more than $60 by horse-drawn sprinklers and flushers.

Part of this saving of time was due to the fact that the trucks create pressure for the flushing water by use of a pump, and consequently do not fill the tanks under pressure and can fill them more rapidly on that account. The water is delivered to the nozzles at 60 pounds pressure by a two-stage centrifugal pump driven from the propelling motor, an auxiliary transmission providing two speeds so that that of the pump can be varied. The truck carries a 1,200-gallon tank. It is equipped with flushing nozzles in front and sprinkling nozzles in the rear, capable of flushing or sprinkling a 50-foot roadway at one trip. The truck travels 8 miles per hour in sprinkling service and 4 to 6 miles in flushing. Five of these have been purchased from the Moreland Motor Truck Company by the Street Cleaning Department of Los Angeles and have recently been put into service.

FLUSHING END OF LOS ANGELES MOTOR FLUSHER AND SPRINKLER.

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AUGUST 10, 1916

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Usage Districting and Building Restrictions.

We believe that all who have looked into the subject have agreed that the greatest good not only to the greatest number, but also to practically every individual citizen of any city, would be served if each district thereof could be insured a development along certain lines, free from any future encroachments of such buildings or such uses of property as would lower all values except that of the property put to objectionable use. A builder of residences, for instance, would be willing to pay more for land, and even to receive a lower rate of return in the form of rental, if sure that no manufacturing or large business establishment would ever be allowed to locate in the district to lower its value for residential purposes. A retail merchant would be greatly benefited by the enforcement of regulations which would insure him for all time against the removal or change of character of a neighboring residence district from which he draws his customers, and against the location in the neighborhood of an industry which would make his street less attractive to shoppers.

It has been demonstrated also that while one tall building in a block may be a profitable investment, the profit vanishes as others are built; and that if all buildings are to be of equal height, the most profitable height is far short of that of the "sky-scrapers." Also that the additional profit from one high building in a block is less than the reduction in profits derived from the others which is caused by the diminution in light and air occasioned by the high building. In other words, that while one high building in a block may be profitable to the owner, the construction of such a building results in a reduction of the total investment value of the entire property in the block.

Two difficulties have been recognized in securing such regulation of uses and building restriction—the legal one of formulating laws which the courts will not declare to be unconstitutional; and the practical one of performing the actual districting and regulating with a minimum of favoritism and hardship to individuals and a maximum of benefit to the citizens at large. The latter requires the selection for this purpose of men of absolute honesty and impartiality, possessed of common sense and good judgment and with an intimate and broad knowledge of all matters which have a bearing upon the principles involved. The legal difficulties a few years ago would have been insuperable; but for the past ten years court decisions have been progressing further and further in the direction of restriction of property rights where these are opposed to the public good, and the point has practically been reached in many states where legislatures and courts are both willing and in a position legally to grant such rights to cities.

Boston has already made a start, especially in the limiting of the height of buildings. New York has just taken the final steps toward adopting building restrictions and segregating the various classes of property uses, which far surpasses anything in this line previously attempted in the United States, or even in Europe; the general features of which are described in this issue. It is significant that in a number of public hearings on the matter there was practically no opposition to the general principles laid down; and comparatively few changes were made in the designation of streets and sections to be included in the several restricted districts. This is probably due in a large measure to the diplomacy of the commission and its education of the public in its ideas during the past few months; partly also to the serious slump in New York real estate in several districts due to a recent change in the character of use to which they are put, which has given practical and emphatic illustration of the correctness of the principles advanced by the commission.

Interest on Municipal Deposits.

A municipality, like any large business, requires a considerable amount of cash for its daily expenses and weekly and monthly payrolls, and keeps this cash in banks, to be drawn upon by the orders of the proper official or officials. Probably most cities' taxes are due at or before the beginning of the fiscal year, and the larger part of the year's income is on hand from the start, being on deposit in a selected bank or banks.

The depositing of this money has been the cause of more or less justified accusations of official graft, or at least of favoritism, to the taxpayers' loss, in many cases. The large sums on deposit frequently earn very little interest for the public treasury, for which there can be no adequate excuse. The only defensible method would seem to be the depositing of the funds in the bank which would pay the highest interest; local banks being preferred unless they seemed to have combined to keep down the interest rate.

The city chamberlain of New York, Milo R. Maltbie, whose office has on deposit fifty million dollars of the city's money, has endeavored to go still further in securing higher interest from the banks. He noticed that the amount on deposit during any quarter seldom if ever fell below $20,000,000. He therefore has divided the deposits into two accounts, one of which (called Class A)

will be inactive, and will not be drawn upon unless all of Class B or fluctuating accounts should be exhausted, which is extremely improbable. He asked the banks and trust companies to submit tenders of the interest which they would be willing to pay on both Class A and Class B accounts, and thirty-seven have offered higher rates (exceeding 3%) for the former than for the fluctuating accounts; the increase amounting to twice the total expenses of the chamberlain's office.

It seems probable that most cities could, by a little foresight, determine beforehand, for each quarter, what amount of city funds could be left untouched throughout the quarter and, by properly presenting the matter to competing banks, secure a higher rate of interest on this amount.

BUILDING RESTRICTION IN NEW YORK

Regulations Recently Adopted Which Segregate Uses of Property and Restrict Height of Buildings and Area of Land Occupied Thereby

A commission known as the Heights of Buildings Commission was appointed by the Board of Estimate and Apportionment of New York city on February 27, 1913. The report of this commission resulted in an amendment to the city charter in 1914, and to assist in carrying out the power conferred upon said board by this amendment and to district the city for the purpose of regulating the height of buildings, the area of courts and yards, the location of trades and industries, and the location of buildings designed for specified uses, the board on May 22, 1914, appointed a Commission on Building Districts and Restrictions. The amendment which authorized the appointment of this commission directed it, before submitting a final report, to make a tentative report and hold public hearings thereon at such times and places as the board may require.

The commission submitted such a tentative report in March of this year and a number of public hearings were held; following which the final report was submitted to the Board of Estimate and adopted on July 25. An abstract of the report is given herewith:

The present almost unrestricted power to build to any height, over any portion of the lot, for any desired use, and in any part of the city, has resulted in injury to the health, safety and general walfare of the city and to real estate and business interests. A certain degree of order and system in building development is essential from the viewpoint of public health, safety, and welfare, and also to the conservation of property values. In city building, even a poor plan is better than none; haphazard city development without any plan or control is ruinous. Natural laws and economic forces are not strong enough to prevent the invasion of a district by inappropriate uses that are destructive to the highest use of said district. In New York, through haphazard construction and invasion by inappropriate uses, the capital values of large areas have been greatly impaired. The uncertainty of the future of a district is a hazard in real estate investment therein which increases the net earning basis required to induce investment, and consequently lessens capital values throughout the city. In a district which is changing in character, not only is there a decline in property value, but unwholesome conditions prevail, since old buildings altered to suit new uses are usually faulty in light, air and sanitation, while declining values make it difficult or impossible to enforce proper standards.

Every city becomes divided into more or less clearly defined districts of different occupation, use and type of building construction. We have the central office and financial district, loft districts, water front and industrial districts, retail business, apartment house, hotel, tenement house, and private dwelling districts. Generally speaking, a building is appropriately located when it is in a section surrounded by buildings of similar type and use, and the maximum land values and rentals are obtained where this segregation is most complete.

In New York, economic forces tend to the segregation of industries of the heavier type along the water and rail terminals and to the segregation of certain light industries near the wholesale, retail, hotel and passenger terminal center in Manhattan; but there are many kinds of light industries that are free from such segregating force and are found scattered through the business and residential sections. The factory is a blight on the residential section, destroying the comfort, quiet and convenience of home life. Stores, garages and other business buildings scattered among residences are a constant menace to residence property. The concentration of all the neighborhood business buildings on a business street makes the transaction of business more convenient; while the segregation of dwellings on exclusively residential streets adds to the convenience, quiet, attractiveness and amenities of home life and thus tends to increase property values on such streets.

Traffic induced by business buildings or factories tends to make the streets unsafe places for children to play; but in crowded tenement districts the street is the only place available for playing and its use for this purpose is one of the most important which it serves. By entirely separating the residential and commercial districts, the streets in the former become much safer playgrounds for the children of the neighborhood. Stores, garages and industrial buildings scattered among residences increase the danger from fire and explosions, and this fact alone would justify the exclusion of them from strictly residential areas.

In preparing this districting regulation, the aim has been to provide adequate housing areas adjacent to factory areas in order that the employees may live within walking distance of their work, and at the same time prevent the future encroaching by the factories upon such housing areas.

HEIGHT AND AREA DISTRICTING.

The maximum beneficial use of any given block or area is also largely dependent on a certain measure of uniformity in its development as regards height, yards and open spaces. Such use would in general be enhanced if the property owners could enter into an agreement uniformly restricting the height of buildings and fixing the maximum area of courts and yards. Excellent results have been obtained by the tenement house law, which secures among other things that each owner must contribute his proportion of the light and air furnished to the rear of the buildings from the interior of the block. Much loss of property would have been prevented and vastly improved conditions resulted had ordinances existed making similar requirements in connection with the building of business blocks.

In order to apply to all kinds of buildings the mutually advantageous principle contained in the tenement house law, there must be a partial segregation of buildings according to use, and also a gradation of height, court and yard provisions, particularly as affecting residential buildings. In establishing light and air provisions, the district plan will not usually go as far as and will in no case go further than the purely economic standard indicated by the mutual advantage of property owners and tenants.

To avoid the continuous reconstruction of existing buildings and the evils and misfits often resulting from

the conversion of old buildings to new uses, it is undesirable to base a districting plan on the type of construction appropriate to the present-moment intensity of use; but types of construction should be authorized appropriate for any intensity of use that will probably be demanded and socially justifiable within twenty-five or fifty years.

LIMITATION OF DISTRICTING PLAN.

An ideal districting plan would disregard existing conditions, require the removal of inappropriate buildings and uses, restore districts to their more appropriate use, and sacrifice the vested rights of the individual owner for the improvement and beautification of the district and city. Possibly a method of compensating individual owners for injury suffered by such changes through a method of locally assessing benefits and damages could be worked out. Under the police power, reasonable and appropriate regulations demanded in the interest of public health, safety and general welfare may be enforced without compensating the individual owner for incidental injury or expense involved. The extent to which this power may be used for districting purposes has not as yet been authoritatively adjudicated in this state. The districting plan proposed in this report has been limited to such features as it was believed the courts would uphold as being well within the reasonable scope of the police power. It is substantially limited to regulations which, while essential to the public health, safety and general welfare, are at the same time of mutual advantage to all property owners. This conservatism will probably leave unaccomplished many things that are important in the interest of well ordered city growth, but even without these the plan will constitute the most important step yet taken by any American city toward the direction of its building development in accord with a well considered plan.

USE DISTRICTS.

The report submits maps of each of the five boroughs, establishing residential districts and business districts. "In a residential district, only buildings with their usual accessories designed for the following specified uses may be constructed: Private residences and apartments; hotels; private clubs; religious, educational, curative and philanthropic buildings and institutions.

"In a business district a list of specified industries and uses of a clearly objectionable character are excluded, as are also all other uses that are noxious or offensive by reason of the emission of noise, odor, dust or gas. An exception, however, is made in the case of garages, livery stables, car barns and places of amusement. While it would seem desirable to keep public garages off of all business streets, public business seems to require their location in close proximity to the residential and local business areas. The larger type of factory is excluded from the business districts by limiting the floor space that may be occupied for factory uses in any one building in a business district to 25 per cent of the total floor space of the building, but floor space equal to twice the ground floor area of the building may in any case be so used.

"The proposed regulations apply only to future buildings and uses and do not interfere with any existing structure or occupancy.

"The remaining portions of the city not included in either the residential or business districts are left unrestricted as to use. These include large areas chiefly along the water front and railroads, where an industrial use either exists or is anticipated, and also certain large areas in the undeveloped sections where either a residential or industrial use may prove the more appropriate, depending largely on future port and terminal developments.

"In residential neighborhoods the plan has been to preserve the side streets wherever possible for strictly residential use. The avenues along the ends of the block and the main thoroughfares have usually been included in the business districts. The business use of the avenue is permitted to extend 100 feet back along the residential side streets. In some of the less developed sections it has seemed feasible to indicate only every second or third avenue for business use and thus secure a larger and more attractive and self-contained residential area."

The commission realizes that further sub-division could probably be made with advantage in particular cases. What uses are inappropriate on a local retail business street depends somewhat on the character of the adjacent residential population; and those that are inappropriate in a light manufacturing district are not necessarily so in a heavy manufacturing district. Various uses that are often somewhat harmful in a residence or business district have nevertheless been included therein for lack of better place and to avoid creating additional classes.

No comprehensive plan for the future physical development of the city has yet been worked out. Such a plan would include plans for port and terminal facilities; for park development, especially along the water fronts; extensions of the subway system and of the surface lines, etc. All this makes the probable or desirable uses of various areas exceedingly uncertain, and accordingly these have been left undetermined and unrestricted. It is anticipated, however, that when their appropriate use is more fully disclosed it may seem wise to restrict them in part to business or residence use.

The commission especially requested that local civic associations and property owners study carefully the tentative designation of the business streets in the residential sections. Their intimate knowledge of local conditions and requirements is essential to the perfection of the plan, and may, it is thought probable, lead to the elimination of certain of the proposed business streets with advantage to the future development of the residential sections affected.

(To be continued)

OVERHEAD EXPENSES OF THE CALIFORNIA HIGHWAY COMMISSION.

The California Highway Commission operates a purchasing department and supplies to contractors all material that goes into the road. It thus saves to the state or county thousands of dollars and insures the use of proper and first class materials. The magnitude of the purchasing work may be shown by the purchases for one month—August, 1915—which included 3,145 cars of rock and sand, 385 cars of cement, 9,500 barrels of oil, and other materials aggregating about 4,750 cars.

The commission does its own auditing and disbursing and the total cost of administration, including purchasing, auditing and disbursing, engineering salaries, expense, rentals, etc., is but 4.41 per cent on an expenditure of $13,746,396, distributed over 1,320 miles of highway. Of this total, $11,591,188 represents contract payments and materials furnished. In other words, 84.32 per cent of the total expenditure went directly into roads. Of the 15.68 per cent, stores and equipment on hand amount to 1.19 and field and drafting work on 850 miles of highways in advance of contracts represents 1.90 per cent. The gross overhead expenses, therefore, are 12.59 per cent. Included in this are many other items not properly chargeable to overhead but not easily segregated, a great deal of money having been spent on design and inspection of bridges built by counties and in gathering field data on many highways in addition to those permanently surveyed. The remainder of the 12.59 per cent represents field and office drafting work, the rigid and expensive system of resident engineer inspection, salaries, expenses and other similar expenditures.

The WEEK'S NEWS

State Road Costs in Wisconsin and New Jersey—Sewerage and Water Supply of Canadian Border Cities—The Indianapolis Water Valuation Case—Summer and Water in Erie, Philadelphia, Pittsburgh and Cleveland—Waterworks in Canada and Arkansas—Tacoma's Prosperous Municipal Light Plant—Developing Niagara—Stopping False Alarms in Philadelphia—Valuation of Washington Car Lines—End of New York Car Tie-up—Districting in Philadelphia and New York.

ROADS AND PAVEMENTS

Road Funds in Wisconsin.

Madison, Wis.—Reports prepared by J. D. Mack, state engineer, show that aid in road construction in Wisconsin this year will affect about 1,200 miles of road. The amount of funds available for the work is given as $4,020,000. About 30 per cent. of the work was completed by the beginning of July, according to the engineering report. Funds available for state aid in bridge construction amount to approximately $400,000, and county aid for bridge work is estimated at $600,000. Nearly eighty bridges are to be constructed under the two funds this year, the report states, and about one-fourth of them were completed July 1. The total contemplated expenditures under engineering supervision of the Wisconsin highway commission branch of the state engineering department is reported at $5,023,100.

Road Employes Must Be Insured.

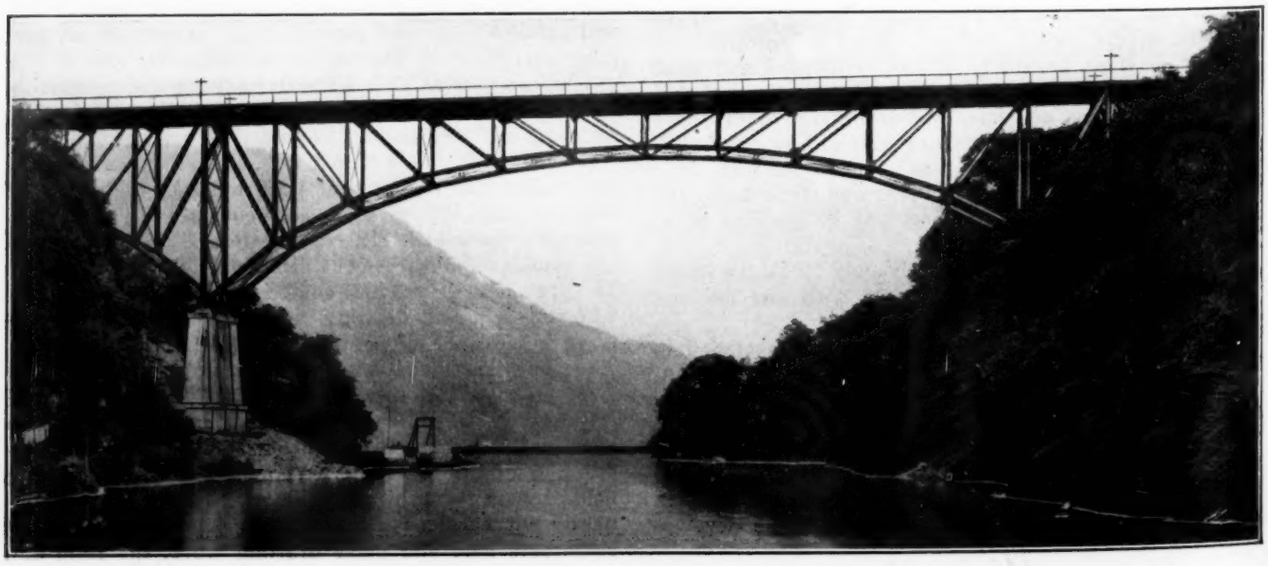
Albany, N. Y.—The state, counties, cities, towns and villages of the state must now insure under the workmen's compensation law all of their employes who are engaged in the hazardous employments enumerated in that law in the same manner as private employers are so compelled. Formerly the policy pursued by the state and its various municipalities did not call for such insurance. This policy was grounded on the belief that since the state and its municipalities were not engaged in business for pecuniary gain, their employes did not come within the provisions of the compensation law. State commissioner of highways Edwin Duffey and the various town superintendents of highways submitted inquiries to attorney general Egbert E. Woodbury for his opinion upon the application of the recent amendment to employes working upon the highways of the state and the roads of the various towns. That such employes are specifically covered by the amendment to the compensation law and that it makes it compulsory for the state and its municipalities to provide compensation insurance is the gist of the attorney general's ruling.

New Bridge Opened.

Newburgh, N. Y.—The new viaduct across Popolopen Creek at "Hell's Hole" at Fort Montgomery, in Bear Mountain Park, has been opened to the public with appropriate ceremonies. It forms an important link in the fine Storm King scenic highway, which is to be a feature of the development of the lands of the Palisades interstate park commission. George W. Perkins, president of the commission, was the first to ride across the bridge. The structure, which is shown in the accompanying illustration, cost $87,000. The steel work cost $53,000. The bridge is about 600 feet long with a span of 320 feet and a height above the water of 137 feet. The roadway is 30 feet wide. Not only will the bridge be a part of the park developments, but it will make a short cut for traffic and will stop the numerous accidents, which averaged three a week during the past two years, caused by the tortuous grades.

The Cost of Roads in New Jersey.

Trenton, N. J.—According to figures compiled from official sources by the State Chamber of Commerce, over $14,000,000 has been expended of county funds and moneys from the motor vehicle department for the repair of roads in eight years. And this huge sum is by no means all that has been laid out for the same purpose in that period, for the chamber, in its report on the subject, calls attention to the fact that no compilation or estimate of the cash devoted to road repairs by townships, boroughs and other local divisions of the counties has ever been prepared. If this money were included in the totals given, it is possible, the report says, that the grand total for road repairs for the period would approximate close to $20,000,000. The report adds that "in the last nine years almost $3,000,000 have been appropriated by the legislature to assist the various counties in building certain roads. The counties in turn have expended almost $6,000,000 for their share in the cost of those same highways, so that since 1907 there was an expenditure by state and county combined of nearly $9,000,000 for the construction of state-aid roads. The



Courtesy, Newburgh (N. Y.) News.

POPOLOPEN BRIDGE IN PALISADES INTERSTATE PARK.

counties have built many roads unaided during the past nine years. Local divisions of the counties such as townships, boroughs, villages, etc., have also built some of their own roads. Disregarding this last item and taking the figures which can be estimated and assembled, there is full justification for stating "that since 1907 the state of New Jersey has spent for road maintenance, repairs, construction and administration—not including city streets or town streets, etc.—a sum of money not far short of $35,000,000." The growth in total expenditures for repairs has been enormous in the years covered in the report. In 1907 the total was $648,488.60, while in 1915 it was $4,161,245. Each year the advance in the total was steady. A part of this increase is to be accounted for by the fact that a large part of these so-called repairs were really reconstructions of old roads.

SEWERAGE AND SANITATION

Sanitation on the Canadian Border.

Buffalo, N. Y.—Councilman Kreinheder has sent letters to the mayors of Niagara Falls and the Tonawandas and the president of the village of La Salle, asking them to send representatives to a meeting in his office for a joint discussion of the problems of sewage disposal and prevention of pollution of boundary waters along the Niagara frontier. The international joint commission that has been considering these problems has recommended that this city build sewage disposal plants at a cost of about $3,000,000. It has suggested plans for other cities along the Niagara river. The Buffalo councilmen are in sympathy with the purposes of the commission and are willing to co-operate with it in so far as the financial condition of the city will permit. A tentative discussion was had with the city manager of Niagara Falls as to the advisability of the affected American cities joining in such action. It is proposed that interested cities join in a submission of certain questions for advice to at least three recognized sanitary experts and that the expense of such advice be distributed among the interested cities in proportion to their population.

Windsor, Ont.—Edward Brian, Windsor's city engineer, has been chosen chairman of the board of engineers which will prepare plans for joint water and sewerage systems for Windsor, Walkerville, Ford City, Sandwich, Ojibway and Sandwich West. Leonard Rice, assistant engineer of Ojibway, is to be secretary. Complete plans, with the cost, will be placed before the Essex border utilities commission in time for the ratepayers of each municipality to pass on the project at the January elections. Lake St. Clair may be the source of the new water supply, it is said, while the trunk sewer will be laid along the river front to a point near Amherstburg.

Infantile Paralysis Still Baffles Doctors.

New York, N. Y.—Apparently no hope is to be built on the figures in the sweep of the poliomyelitis epidemic, as the rate of increase has been rising in the last few days. Up to August 9, the number of cases reported totaled 5,336 and the number of deaths 1,194. While the organization for handling the cases is becoming more efficient, no scientific power in the hands of the authorities seems to be of any avail to check the plague. The experts are continuing their conferences and researches. There is a strong tendency on the part of specialists to give up the opinions on the origin and transmission of the disease which were so common during the early days of the outbreak. Two doctors have theories which blame the disease on food, although there have been no indications that the epidemic can be traced to any particular food supply. A neurologist, not a health official, traces the origin of the disease to gastro-intestinal sources and not to nose and mouth secretions. A great handicap to adequate investigation is the lack of bodies for purposes of autopsies in spite of the value of such research and of the large number of deaths. There seems to be also the usual jealousy at work and the distinctions of fields of specialization are retarding efficient utilization of all the possible resources of scientific knowledge. The decided absence of any definite facts still persists. Plans for the house-to-house canvass recommended by the scientists who met here last week have been formulated. The idea of the canvass, according to deputy health commissioner Billings, originated with the Association for Improving the Condition of the Poor, the Charity Organization Society, and the United Hebrew Charities, who offered to employ their nurses in the work. Almost simultaneously three life insurance companies volunteered to lend the services of their 2,000 visitors to the department of health. After the visiting scientists had indorsed the idea health commissioner Emerson called representatives of these various organizations together and formed the committee. According to the arrangements to be adopted, Dr. M. B. McMillan, assistant sanitary superintendent of the department of health, will supervise the work. The life insurance visitors will inspect homes all over the city, watching chiefly for sickness among children and sanitary conditions, while the nurses of the charitable organizations will make a special search for undiscovered cases of poliomyelitis. The surrounding towns which had declared quarantines against New York are "becoming more sane," according to Dr. Charles E. Banks, senior U. S. Public Health Service surgeon, in charge of issuing Federal certificates to outgoing children. The city health department has issued about 65,000 certificates.

Conditions outside of New York City are practically the same as in.

County Sanitary Survey Begun.

Liberty, Mo.—The health survey of Clay county has begun, following a number of meetings addressed by Dr. L. L. Lumsden, the federal expert, at the head of the men in charge of the investigation. This will be the first county in Missouri to have such a survey and Dr. Lumsden said that it had been selected because the conditions promised that Clay county would do most to "spread the contagion of good health we hope to start." In charge of the Clay county work is Dr. H. C. Yarbrough, assisted by Dr. R. R. Sayers, Dr. P. M. Stewart, Dr. Thomas Parran, Dr. F. A. Reuter, Dr. H. R. O'Brien and Dr. E. R. Hunter. State and county health officers will co-operate with them. Dr. F. H. Matthews, president of the state board of health, has been in conference with Dr. Lumsden, and two advanced students of the Missouri University have been detailed to assist in the survey.

WATER SUPPLY

Oppose City Company Agreement.

Indianapolis, Ind.—Twelve citizens have petitioned the state public service commission to retain jurisdiction over the question of water rates and to proceed with the adjustment of rates, regardless of the contract recently entered into by the city administration and the Indianapolis Water Company, seeking to fix the rate for twelve years. The agreement, which has created a great deal of unfavorable comment from the citizens, was signed after secret sessions between Mayor Bell and members of the board of public works and company officials, while the public service commission was considering a petition filed in 1915 by the city through its corporation counsel, William A. Pickens. The citizens declare that the city officials have no authority to make rates, that the new rates, as well as the old, are unfair and unreasonable, and that improper influences were at work in the making of the agreement.

Meanwhile the valuation has been completed by the commission and the report sent to the city and the company with a ten-day allowance for the filing of exceptions. Henry O. Garman, chief engineer of the commission, filed with Thomas Duncan, the chairman, the appraisal, which places the value of the company's property at $7,625,114. The reproduction value is fixed at $8,252,435. In the two summarized totals of all the units of value of transmission and distribution, buildings and miscellaneous structures, plant equipment and general equipment, 12 per cent was added to cover such items as "engineering, superintendence,

interest on investment during construction, fire and liability insurance, small omissions of inventory, contingencies, etc." No allowance is made for "going value," the work of the engineers being confined to the valuation of tangible property. The last annual report from the company to the commission shows a "book value" of plant and equipment, beginning with the Alvord and Metcalf appraisal for the company in 1909 and adding improvements during succeeding years, of $12,015,566.76. This report shows also outstanding stock of $5,000,000, and issued and outstanding bonds of $5,658,000, making a total capital account of $10,658,000. Some of the water rights for which the company claimed a large valuation are found by the engineers to be "worth nothing on a 'power-cost reproduction new' basis." The engineers used the "cost reproduction new" method of valuation, using "fair" prices, "reasonable" "normal present-day" prices, "fair" and "reasonable" assumption as to methods of reconstruction. In valuing the water rights, the riparian rights are included in land values which in many cases would otherwise be "practically worthless," and the power value of the water rights are included.

Pump Breaks Down Twice Under Record Strain.

Erie, Pa.—Pumping at the rate of 10,000,000 gallons a day, 2,000,000 above rated capacity in an effort to keep a record demand supplied, finally told on the big Worthington pump and the head cracked. Erie was put in the greatest danger of famine it has ever experienced. The pump was used on high pressure service and when it broke down a big Bethlehem pump, which had been supplying the bulk of the water needed, was put partly on the other service. A small 5,000,000-gallon Holly pump, which was in reserve, was put into service to make up the low pressure supply to 13,000,000 gallons. Arrangements were immediately made with the Erie Welding Company and the broken casting was repaired. But in spite of repeated warnings by the commissioners the demand and waste kept up at a 28,000,000 gallon a day pace and the pump broke down again a few inches away from the original break, due to strain in repairing. The reservoir supply was greatly depleted. The head was again welded temporarily, but a new part is to be cast and it is also proposed to install a new pump. Meanwhile, parts of the city are experiencing low pressure.

Waterworks Superintendent Reinstated.

Nashville, Tenn.—George Reyer, waterworks superintendent, has won his suit for reinstatement before Special Judge G. B. Kirkpatrick. The commissioners have decided not to appeal the case. The office of superintendent of the plant had been abolished by a vote of two commissioners and the work turned over to the commissioner of waterworks. Witnesses for Superintendent Reyer testified strongly that a competent engineer was needed to control the system and that the present commissioner, Elliott, while capable, could not assume the engineering duties. Further operation without a competent superintendent was declared to be dangerous. A number of experts testified as to the competence of Reyer, showing that his skill and knowledge had saved the city a great deal of money in construction and operation. One of the superintendent's achievements was to reduce the pumpage from 16,600,000 gallons in 1907 to 11,500,000 in 1913. Since then, in his absence, the pumpage increased to 13,500,000. A compromise will probably be effected as to the salary due to Superintendent Reyer.

Philadelphia Water Shortage.

Philadelphia, Pa.—Although the water famine has been conquered for the present, the city faces the possibility of a more acute one during the month of September, according to Chief Carleton E. Davis of the water bureau. "With the present inadequate facilities of the bureau," Chief Davis said, "we find it impossible to refill the reservoirs and supply basins, which were emptied a few weeks ago when the city was suffering from a shortage of water. Some little gain is made each night and over Saturdays and Sundays, but it is not appreciable and will have practically no effect when the great demand comes in September. The return of a great number of vacationists to the city, the starting of many industrial establishments on full time and the opening of the public schools throughout the city will all prove a drain on the resources of the city water supplying division." Another factor, according to Chief Davis, which will lead to a large increase in the amount of water consumed is the fall housecleaning season. Each year, during that period, he stated, much more water is used in private residences than at any other time of the year, except possibly in the spring cleaning period. To place the water supplying machinery of the city on a basis which would enable it to cope with all emergencies, it is estimated that about $5,000,000 will be needed. This includes the installation of the new machinery and the renovation and repairing of the machinery now in operation. The water committee of councils has been investigating the system and Mayor Smith has promised support to Chief Davis. Meanwhile, attempts are to be made to cut down the consumption. Plans have been prepared by Director Wilmer Krusen of the department of public health and charities for saving millions of gallons of water at the Philadelphia General Hospital. Superintendent McAllister investigated the character and use of the water fixtures and it was concluded that the 3,500,000 gallons daily consumption of water in the big institution could be cut down almost one-half by the introduction of automatic stoppers and similar devices. Another of the opportunities for saving was seen by Chief Davis in the twenty-five public baths of the board of recreation. These he estimated used 10,000,000 gallons of water daily and he has under consideration the possibility of the installation of sterilizing and filtering devices, which would purify the same water for repeated use and save easily 5,000,000 gallons a day.

Metering Eliminates Summer Shortage.

Pittsburgh, Pa.—For the first time in several years the city water bureau has not found it necessary during an intensely hot period to warn users of city water to stop wasting it. Progress which has been made in the installation of water meters is given credit for producing the improved conditions. The bureau has about 30 service inspectors who annually have had to warn the owners of the lawns and the sprinklers in hot weather. This year the warnings have not been given for the reason that the increased use of water has not been sufficient to threaten any section with a shortage. The city now has an ordinance which makes it possible for the bureau to put a meter in any building with or without the consent of the owner, and the bureau has been devoting special attention to the Squirrel Hill district, where waste for lawns has been most prevalent. Squirrel Hill is supplied from the Herron Hill basin, which is the highest water basin in the city, and which also supplies the residents of the thickly populated Hill district. A shortage of water among the people of the Hill district is particularly distressing during hot weather. Superintendent C. A. Finley, of the water bureau, believes that this favorable development of the water situation will tend to facilitate installation of meters everywhere and so to postpone indefinitely the day when the pumping facilities will be unable adequately to supply the city.

Heat Brings Cleveland Water Shortage.

Cleveland, O.—City Water Commissioner C. P. Jaeger was forced to announce that as a result of the heat wave Cleveland would possibly be without water within a short time if more economy was not shown in the use of it and if it did not rain. Mayor Harry L. Davis instructed the police to warn all who wasted water. Lawn sprinklers will not be allowed between 8 a. m. and 5 p. m. Police were detailed to instruct residents of certain sections not to use sprinklers. While the consumption of water decreased July, 1915, over the year previous, it increased last month tremendously. At no point is the pressure what it should be. The supply in reservoirs is rapidly decreasing. The difficulties are aggravated since the tunnel disaster. The west side would have been taken care of in a short time, but now residents of this district will remain on the same supply lines indefinitely, while completing the tunnel is continued as soon as it is safe. During July, 1915, the Kirt-

land pumpage, embracing all the stations, supplied 2,627,738,845 gallons of water. Last month 3,478,057,324 gallons of water were forced through the mains, or an increase of 850,318,479 gallons. Consumption during June, 1916, increased 268,718,393 gallons over May, 1916. The greatest shortage of water supply is shown in the drain upon the three reservoirs. In normal times the Warrensville reservoir is twenty-one feet deep. It is now six feet deep. The normal depth of Kinsman reservoir is twenty-one feet, but now it is a scant thirteen feet in depth. Fairmount reservoir usually registers twenty feet. It is now several inches below seventeen feet deep.

Waterworks Improvements in Arkansas.

Little Rock, Ark.—Arkansas is taking greater strides in municipal improvements than ever before, particularly in the case of installing waterworks. Records of the engineering department of the Arkansas Actuarial Bureau show that in the past year the bureau has been called on to inspect and criticise plans and specifications for waterworks in Benton, Rector, Harrison, Heber Springs and Ashdown, which towns are installing or have completed waterworks, while plans are under way for similar improvements at Hartford, Pocahontas, Malvern, Springdale, Eudora, Nashville, Star City, Beebe, Piggott, Corning, Hatfield, McCrory, Junction City, Walnut Ridge, Portland and Wilmot. Improvements of the present plans are contemplated at Bentonville, Dardanelle, Stuttgart, Arkansas City, Conway. Morrilton and Marianna.

Waterworks in Canada.

Ottawa, Canada.—The Canadian Commission of Conservation has issued a new edition of a report on waterworks and sewerage systems in Canada. In 1867 Canada had only 7 waterworks systems; now there are 528. The total cost to date has been $123,000,000, and the annual maintenance charge is $4,500,000. The total daily consumption is more than 425,000,000 imperial gallons (510,000,000 U. S. gallons). About three-fifths of the plants get the supply from lakes or streams, and the remainder from springs or wells. Of these plants 396 are owned by the municipalities. Water meters and similar articles of equipment are usually sent to the United States for repairs, and as evidence of a field for further business the new volume mentioned states that only 72 of the 528 plants have filtration systems, while meters are used partially in 141 cases and totally in only 30 plants.

Value of Kansas City Waterworks.

Kansas City, Mo.—A special board of appraisers appointed by the state tax commission of Kansas to ascertain the value of the Quindaro water works plant has reported to the Wyandotte county commissioners, placing the total assessment valuation at $1,214,403.35. The county appraisers had set the figure at $1,472,000. The fire and water board was asking a reduction to $1,030,000. The special committee was composed of Charles H. Chandler, state architect, and Jesse Shaw, superintendent of the Topeka, Kan., water works.

Water Survey Bureau Makes Good Saving.

Spokane, Wash.—The activities of the waste survey bureau of the water division were responsible for a saving of 1,310,000,000 gallons of water during 1915, according to the fifth annual report of the division. On sewer flush tanks alone, leak stopping resulted in a saving of more than 1,000,000 gallons a day. Figures given for seventeen city districts show that repair work on mains cut the total pumpage nearly in two. These seventeen districts, before repairs were carried out, used 5,469,200 gallons of water each day. After leaks had been located and stopped, the consumption dropped to 2,982,100. More than 1,500 leaks in all were plugged. District number 29, on the north hill, showed the greatest saving, 577,000 gallons a day. Partly because of this leakage stopping, the total pumpage for 1915 dropped nearly 2,000,000,000 gallons under the previous year, the figures being: 1914, 11,110,516,832; 1915, 9,221,351,678. Per capita consumption also dropped from 218 gallons a day in 1914 to 210 gallons in 1915. Seventy per cent of the services in the city now are metered, a slight increase over the previous year. The total receipts and expenditures for the two years compared are as follow:

	1914.	1915.
Total earnings	$461,010	$420,240
Operation and repairs	165,084	150,388
Paid on water debt	50,000	64,000
Interest on water debt	128,204	119,423
Net earnings	169,445	153,428

STREET LIGHTING AND POWER

The Cost of Valuation.

Columbus, O.—The public utilities commission of Ohio spent $169,394.50 in the last eighteen months in determining the physical valuation of public utilities of the state. In this amount is included expense of valuing of the following companies: Cleveland Electric Illuminating Co., $69,196.13; Union Gas & Electric Co. of Cincinnati, $28,359.39; Columbus Railway, Power & Light Co., $7,623.37, and the Kent Water & Light Co., $1,176.83.

Bigger Business and Lower Rates for Municipal Plant.

Tacoma, Wash.—The 20,000 electric light and power patrons of the municipal electric department used approximately 2,500,000 more kilowatt hours of current during the first six months of 1916 than for the first half of 1915, and paid about $25,000 less. The reason is the new cut in rates which took effect the first of the year. Superintendent G. W. Collins of the electric works said at the time the cut was made that it would take a year's increase in business to bring receipts up to what they were. His prophecy seems likely to be fulfilled, as each month shows a substantial increase in power consumption over the corresponding month of last year. An indication of the amount of power used is the amount generated at the Nisqually power plant. From this amount there is a loss for transmission and transforming on which it is difficult to get an estimate. The power plant figures for the six months' period are as follows:

	1915.	1916.
January	2,827,800	3,086,100
February	2,286,300	2,774,400
March	2,246,300	2,819,500
April	2,136,800	2,576,300
May	1,989,300	2,540,000
June	1,970,500	2,241,400
Totals	13,457,000	16,037,700

An itemized statement of earnings in the light department for last month, showing the proportionate amounts received from various sources, is as follows:

Commercial lighting	$22,342.20
Commercial power	11,077.56
Municipal street lighting	4,035.72
Municipal building lighting	338.90
Municipal power	279.55
Miscellaneous	869.95
	$38,943.88
Profit of merchandise and jobbing	.96
Rents, conduits, etc.	47.64
Total	$38,992.48

The total current consumed for the first six months in 1916: Light, 5,127,723 kilowatts; power, 7,595,574; total receipts, $284,892.39. Total current consumed first six months, 1915: Light, 3,927,532 kilowatts; power, 5,233,183; total receipts, $293,772.53. The falling off of $8,880.14 in receipts is due mainly to the reduced rates in residence lighting and power for manufacturing. The new rate allows power customers to use current at power rates. This arrangement was also extended to customers of the Puget Sound Light & Power Co., in accordance with the new power agreement. The city purchases direct current from the power company at a rate of 1.2 cents a kilowatt hour, but the amount of direct current used is growing less as direct gives way to alternating current for all purposes. The rate of 1 cent a kilowatt for electricity for home power consumption is the principal increase factor. "The light department has made $750,000 net profits during the past two years," said

Superintendent Collins. "The price of electric current was cut because it was thought the people who own the plant should get the benefit of lower rates thus made possible. When receipts from increased consumption reach their former level, we will again cut the rate."

New Plans for Niagara Development.

Niagara Falls, Ont.—The development of two million horsepower of electric energy below the Niagara Falls without disturbing the Horseshoe and American Falls, and the expenditure of $100,000,000 in the work, are proposed in a scheme submitted to the Dominion Government at Ottawa, for approval. The promoters are an incorporated company, the Thomson Porter Cataract Company, headed by T. Kennard Thomson and Hon. Peter A. Porter, two Americans. The scheme proposes a dam in the rapids below the falls to raise the water one hundred feet. Half the power developed would go to New York State and the other half to Ontario, and the company would agree to sell the Canadian half of the dam to Canada at the inaugural cost, plus the percentage, and to make an agreement as to the charge to be made for power. The government will appoint a commission of engineers to look into the scheme. "We do not propose taking more water from above the falls for power purposes; the carrying out of our project would in no way effect the cataracts," said Mr. Porter. "We contemplate using the water after it passes over the falls. The building of a dam in the lower river would eliminate the Devil's Hole rapids, but we contend that the miniature horseshoe fall that would replace them would more than compensate in the way of scenic attractiveness."

Meanwhile another 12,500 h. p. unit will be in use in the power house of the Canadian Niagara Power Company about September 1, and two others will probably be generating electricity before the end of 1916, according to Philip P. Barton, general manager. When the three units now being installed are in use the plant will operate at full capacity. There are now five 10,000 h. p. units and two 12,500 h. p. units in operation at the plant of the Canadian subsidiary of the Niagara Falls Power Company. The work of installing the three additional units is being rushed. The company is installing the additional units despite the threat of the Canadian government to cut off the exportation of power. The company now exports a large block of power to the United States. If the exportation of power is prohibited the industries of Niagara Falls, N. Y., and other American cities will be hard hit, for much of the power developed here is used in New York state. With the three units now being put into operation the Canadian Niagara Power Company will have a total generating capacity of 112,500 h. p.

FIRE AND POLICE

Must Pay for Out of City Alarms.

Ogden, Utah.—If the country districts are to receive benefit from the Ogden city fire department the county commissions must agree to pay the city $50 for each call answered, the Ogden commission has decided on the recommendation of mayor Abbot R. Heywood. In the past few years the city apparatus has fought fires outside the city on several occasions without receiving remuneration, because there is no county ordinance providing for fire protection to residents outside the city. The present action was decided upon following the fire at Idlewild when the city's motor apparatus incurred great expense in fighting the flames and reaching the scene.

Merit Ratings for Fort Worth Police.

Fort Worth, Tex.—The Fort Worth police department is now on a civil service basis, the new merit system having become effective. Favoritism and politics are to be eliminated, and all policemen and officers will be graded, promoted or reduced accordingly. Assistant Chief Chollar went to Dallas and investigated the police merit system there. Under the plan a policeman may get sufficient demerits to give him a grade of only 30 per cent and if he is slow improving in this mark he will be discharged. Thirty per cent will be the lowest figure allowed. Ten, twenty, thirty up to sixty demerits can be filed against an officer for various offenses. Disobedience of orders, talking back to a superior and drunkenness while on duty will constitute the most serious offenses and will reduce a man to 30 or cost him his job. If, however, a patrolman happens to drop to 30 and next day stops a runaway team and saves a life he will be raised to 90. Provision is made for credits for every act of efficiency. In making promotions the man who has the best record under this plan will be advanced. No policeman will be allowed to talk politics on his beat, and if caught doing this he will be subjected to 20 demerits. He is forbidden to discuss anything except subjects pertaining to his work. Following is the list of demerits:

Discourtesy to citizen, one to five demerits; smoking while on duty before 10 p. m., one demerit; untidy appearance, one or two demerits; unnecessary violence, cursing or abusing prisoners, five demerits; wilful neglect of duty, five demerits or dismissal; negligence in performing duty, one to five demerits; making false statements to superior, five demerits; failure to make proper reports regarding duty, one to three demerits; absence without leave, one to five demerits; failure of superior officers to report violation of any rule by subordinate, one to five demerits; failure to report over Gamewell system, one or two demerits; insubordination, one to five demerits; cursing while on duty, one to five demerits; failure to salute superior, one demerit; talking to any one while on duty except on official business, one to three demerits.

Device to Discourage False Alarms.

Philadelphia, Pa.—Chief McLaughlin of the Philadelphia electrical bureau has devised a new fire alarm box which he believes will be more efficient than those now in use and also reduce the sounding of false alarms. The device was made in the machine shop of the electrical bureau at city hall by employes of the city according to the chief's design. Describing the new box, Chief McLaughlin said: "The new keyless door has been designed to facilitate the transmission of alarms of fire and also for the purpose of preventing the sending of false alarms. By simply pulling the lever on the outside of the box down, the signaling mechanism in the box is operated, and at the same time a local alarm is given on a loud-ringing gong mounted inside the door. This local alarm can be heard a block or more away and attracts the attention of the police or the citizens nearby to the fact that the box has been pulled, thereby discouraging the sending of false or malicious alarms." The keyless door can be affixed to the present boxes at a cost of less than $15 each.

MOTOR VEHICLES

Department More Than Half Motorized.

Omaha, Neb.—Thirteen of the twenty-one fire department stations are now equipped with motor-driven apparatus. Eleven American-La France combination hose and chemicel trucks have been installed, the last shipment having arrived and been tried out. The city already had two motor trucks.

New Truck in Service.

Alma, Mich.—The new fire truck made by the Republic Motor Truck Co. of Alma, and sold to the city, has been given severe tests and found to be very satisfactory. The truck has chemical tanks, ladders, hose and complete fire-fighting equipment.

City Buys Four Trucks.

Wheeling, W. Va.—The city council, in special session, voted to buy four new Peerless fire trucks for $6,000 for immediate delivery. Fire Chief Rose and a committee visited the Cleveland factory and were greatly pleased at the tests of the machines. The bargain price was due to the need of room by the company for working on U. S. government orders.

Auxiliary Apparatus in Commission.

Bayonne, N. J.—The new auxiliary auto, of the most modern type, has been put in commission at No. 1 engine house. The auxiliary squad, which is to be composed of eight men, has already reported for duty with lieutenant William McLaughlin of No. 3 engine as acting captain. The auxiliary auto will answer all alarms. It is completely equipped for fire-fighting with two chemical tanks, two 24-foot pompier ladders, a powerful searchlight and a large life net.

GOVERNMENT AND FINANCE

Standardizing City Laborers' Pay.

New York, N. Y.—In a report just issued by George L. Tirrell, director of the Bureau of Standards, it is stated that "below $840 a year an unskilled laborer's family of five persons cannot maintain a standard of living consistent with American ideas." Therefore, the bureau, Mr. Tirrell says, has not recommended a rate below $840 for the rank and file of the street cleaning department for unskilled laborers, stablemen, hostlers and drivers. A plan for standardizing city employees' salaries will be submitted to the Board of Estimate and public hearing will be held on the proposition. According to Mr. Tirrell, the proposed rates of pay in the departments are based on these points: The market value of the particular kind of work performed, conditions surrounding the municipal service, the assumption that the city wishes to be a model employer, the theory that range of salary rather than a fixed rate should be established for all grades in the service, the establishment of a proper pension system and the simplification of accounting and payroll audit.

Must Redeem Unsold Bonds.

Newbern, Tenn.—By the decision of the United States Circuit Court of Appeals, Newbern is compelled to pay some $50,000 on improvement bonds it issued several years back and from which it never realized a cent in real cash or otherwise. The bond issue was for $25,000, but accumulating interest has now doubled the amount the town is held for. When ready for floating, the bonds were placed with W. J. Hayes & Co., bankers at Cleveland, that firm merely giving the Newbern officials a certificate of deposit in return. Some time later the Hayes firm became insolvent, but not before it had disposed of the entire lot of bonds, most of them to Ohio banks. When the town refused to pay interest or to acknowledge the bonds, suit was brought in the Federal Court at Memphis by Attorney W. R. Collins of this city, representing the National Bank of Barnesville, O., and the other bondholding banks. The outcome was a judgment holding the town bound to pay bonds, interest and costs. This judgment is now affirmed by the Circuit Court of Appeals and becomes final.

City Engineer as Purchasing Agent.

West Orange, N. J.—A step toward the town manager plan went into effect when Charles A. Winston, who was appointed several weeks ago by the town council as town engineer and surveyor, took charge of that office. Mr. Winston has been invested with the duties of looking after the streets and sewers, the engineering work and the purchasing for all departments. Mr. Winston was appointed for a period of five years and will receive a salary of $2,200 per year. He has taken over the duties in the street and sewer department formerly conducted by Charles E. Hayward at a salary of $1,500 as well as the work which had been done by Mead & Taylor, of Orange, surveyors, who were employed at an average of about the same sum. While a large saving is not expected, as it will probably be necessary for the engineer to engage assistance at odd times, the grouping of the various departments under one head is expected to prove an economy through the elimination of politics in giving out jobs, as well as in greater efficiency and economy by the systematic purchase of town supplies.

Ordinances Burned Cannot Be Enforced.

Hope Mills, N. C.—Because the ordinances of the town were burned some years ago and have never been re-enacted, an indictment against mayor E. L. McDonald of that place for allowing the ordinances to be violated, was dismissed by recorder Cook. The state could not legally prove the existence of a code of ordinances for the town. All that could be produced was a printed list of ordinances which could not be made competent as evidence. The indictment against mayor McDonald, as well as a similar one against chief of police Alex. Bullard, was secured by certain citizens of Hope Mills who are dissatisfied with the administration of the town's affairs. The alleged fact that trains were allowed to stand across the streets in violation of ordinances supposed to exist was one of the charges against the mayor. The evidence in the case was not gone into after it was found that there were no legal ordinances on which to base an action.

RAPID TRANSIT

Valuation of Capital Railway.

Washington, D. C.—The public utilities commission has made public the tentative valuation it has established for the properties of the Capital Traction Company. Original cost of construction and acquisition of road, equipment and real estate now in existence is given at $10,604,483.80; reproduction cost, at $10,812,271.49, and reproduction cost, less depreciation, at $8,959,393.88. This is the first of Washington's big traction systems to be valued by the commission. Its ascertainments of the value of the Washington Railway and Electric Company are expected to be announced shortly. To what extent the company, which is capitalized at $18,000,000 ($12,000,000 in capital stock and $6,000,000 in bonds) will object to the figures is not known. Should it enter serious opposition, as has been done by the Potomac Electric Power Company, weeks may be required for a hearing on the figures, and after that the valuation may be tied up indefinitely by litigation. Universal transfers and other rate matters are to be considered after the street railway company valuations have been established. The tentative valuation of the Capital Traction Company is as of July 14, 1914. Work on the valuation began in May, 1914. Charles L. Pillsbury, chief engineer, and Andrew Sangster, chief accountant of the commission, will be called upon by the commission to explain how the valuations were calculated.

City Wins Viaduct Suit.

Cincinnati, O.—The Court of Appeals has affirmed the verdict and judgment for $61,220.09, with interest from April, 1915, for the city against the Cincinnati Traction Company, as the street car company's proportion of the cost of building the Ludlow avenue viaduct for elimination of Ludlow avenue grade crossing over the B. & O. S. W. Railroad. The viaduct cost $364,023.63. The B. & O. S. W. Railroad Company paid 65 per cent of the cost, as required by the law for elimination of grade crossings, but the Traction Company refused to pay one-half of the remaining 35 per cent of the cost, claiming it was not liable. The Appellate Court finds, with the court below, that the Traction Company is liable under the law, and points out that it receives the best of it by the verdict, because several thousands of dollars of the cost of the viaduct were for rails, poles and other equipment for street cars over the viaduct which are a benefit to the Traction Company only. In regard to the Traction Company's contention that the city would not relocate the street the Appellate Court says city council is given that power.

New York Car Strike Ended.

New York, N. Y.—The strike, which has tied up the city car lines and was marked by considerable bitterness and "appeals to the public" and which threatened in a few days to stop the subway and elevated roads traffic, is now over. The 7,600 men have returned to their work and the public is no longer in danger from badly handled cars while the company is again receiving its fares which, during the strike have helped increase the strikebreaker's wages. Violence was restrained by the presence of two uniformed policemen on each car. The agreement was brought about after days of labor by Mayor Mitchel and Public Service Commission Chairman Oscar S. Straus. The strike leaders agreed to the proposals submitted by the two public officials and these refused to allow the companies to offer a counter-proposal. The unions win—and it is victory for arbitration—which had been strenuously denied by the companies. An investigation by the public service commission showed that Frederick W. Whitridge, president of the Third Avenue Railway Company, who had gone to Europe, was largely responsible for the strike. The commission

found that he "had either intentionally violated an agreement he made with the Westchester men in 1913 to arbitrate differences or that he was so negligent in his duties to his stockholders, his employes and the public, as to forget entirely this important agreement." Mr. Whitridge had full power to act for the directors of the company.

The terms upon which the New York Railways Company and its striking employes agreed, and which were also accepted by the Third Avenue Railway Company and its striking motormen and conductors, state that "The employes shall have the legal and moral right to organize, and the company pledges that it will not interfere with the employes in their exercise of these rights—nor shall employes interfere with other employes in exercising their rights to decline to organize, either by intimidation or coercion. The company shall receive and treat with a committee of the employes upon any and all questions that may arise between them. This committee is to select such spokesmen or advisers as they may choose to represent them, without any objections on the part of the company, and the company will in no way interfere with the selection of the committees of employes, it being understood that if the committee shall select to represent it the officers or other representatives of any particular organization, their appearance on behalf of the committee shall not be deemed to be a recognition on the part of the company of the organizations of which they are the officers or representatives. That the question of wages and working conditions between the employes and the company shall be taken up by and through a committee of the employes with the officials of the company on a date to be agreed upon between them—such date not to be later than Aug. 20, 1916. The committee and the company, in conference, shall attempt to reach a satisfactory settlement upon all questions of wages and working conditions, and upon such points as they may fail to reach an agreement they shall submit to a board of arbitrators—the board of arbitrators to be composed of three disinterested persons, one to be selected by the officials of the company, one to be selected by the committee representing the employes, and these two arbitrators to select the third. In case the arbitrator selected by the officials of the company and the arbitrator selected by the committee representing the employes shall fail within ten days to select the third arbitrator then such third arbitrator shall be selected by the Hon. Oscar S. Straus."

MISCELLANEOUS

New York's Districting Plan Adopted.

New York, N. Y.—The board of estimate and apportionment, by an almost unanimous vote, has approved the plans for districting the city as worked out by the commission on building districts and restrictions. This plan marks the farthest progress in zoning made in this country and probably in any country. There was very little opposition to the main principle and it received the support of the strongest interests concerned. It is, however, significant that the day before the system went into effect plans for buildings to cost $22,655,000 were filed before their time so as to win the race for legality.

Districting for Philadelphia.

Philadelphia, Pa.—Councils have authorized Mayor Thomas B. Smith to appoint a commission to consider and recommend regulations and legislation concerning the location, size and use of buildings in different districts of the city.

Big Terminal Franchise.

Kansas City, Kans.—The voters have ratified the action of the city commissioners in granting the Kansas City Terminal Company a 200-year franchise by a vote of 5,556 to 1,366. They also decided for two passenger stations by 3,888 to 2,834. The ratification ends six years of negotiations and gives the city equal freight facilities with the Missouri side. It also aids the Kansas side by enabling the terminal company to complete its plans and bring the railroads in overhead instead of detouring their passenger trains through switchyards. The station vote settles the long dispute over passenger terminals and will give the city two passenger stations. Two hundred persons voted on the franchise and did not express themselves on the question of stations. The total vote on the franchise was 6,922. The terminal company will expend six million dollars in its Kansas side improvements. This includes a Y-shaped elevated structure through Armourdale and a double-decked bridge over the Kaw River near its present bridge.

Citizen's Gift to Enlarge Park.

Evansville, Ind.—George L. Mesker, a wealthy structural iron manufacturer, has made a donation of $25,000 to the city to enlarge Mesker Park. Mayor Benjamin Bosse has announced that $100,000 will be spent in improving and enlarging the park. An area of 160 acres is to be added to the park, part of which was originally donated by Mr. Mesker.

LEGAL NOTES

A Summary and Notes of Recent Decisions—Rulings of Interest to Municipalities

"Right of Way"—Ordinances.

Ray v. Brennan.—A city ordinance, providing that vehicles going in certain directions should have the right of way over vehicles going in another direction, does not mean that a vehicle not having the right of way at a crossing must at its peril avoid collision with a vehicle having a right of way irrespective of care or negligence by either party.—Supreme Court of Albama, 72 S. R., 16.

Sewer Construction—Decision of Engineer.

Mayor and City Council of Baltimore v. Clark.—The decision of the water engineer as to work, which a contract for construction of city sewer provides shall be final and conclusive, unless modified by the water board, being approved by it, can be attacked only for fraud or bad faith.—Court of Appeals of Maryland, 97 A. R., 911.

Defects in Water Courses—Questions for Jury.

City and County of Denver v. Merchants' Biscuit Co.—In an action against a city for damages from overflow of a creek, evidence that the overflow was from a water course other than the creek, and that it was caused by an unprecedented storm, and conflicting evidence as to city's acts of negligence, held to require submission to the jury of city's negligence.—Supreme Court of Colorado, 157 P. R., 842.

Assessments—Constitutional Requirements.

Kuehl et al. v. City of Edmonds.—The power of the Legislature under Const. art. 7, section 9, to vest cities with power to make local improvement, is not limited by the preliminary estimate of costs of work and notice and hearing thereon under an earlier law so as to prevent authorization by subsequent act of reassessment or supplemental assessment for the actual cost and value duly apportioned.—Supreme Court of Washington, 157 P. R., 850.

Sewer Assessment—Vote—Majority.

Livesey v. Borough of Secaucus.—Where a resolution of a confirmation of a sewer assessment was voted for by three out of the six members of the borough council present, two voting against it and one excused on account of interest, there was not a majority vote of those present.—Supreme Court of New Jersey, 97 A. R., 950.

Dissolution of Corporation—Rights of Creditors.

Walker v. Mayor and Council of City of East Rome.—The charter of East Rome having been repealed, and all of its territory and corporate property transferred, with all of its liabilities, to the city of Rome, where no theoretical continuance of the existence of East Rome, relatively to existing creditors, for the purpose of enabling them to collect their debts. As to creditors and all other persons, the corporation went out of existence for all purposes, and could not thereafter be sued.—Supreme Court of Georgia, 89 S. E. R., 204.

THE MUNICIPAL INDEX

In Which Are Listed and Classified by Subjects All Articles Treating of Municipal Topics Which Have Appeared During the Past Month in the Leading Periodicals.

It is our purpose to give in the second issue of each month a list of all articles of any length or importance which have appeared in all the American periodicals and the leading English, French and German ones, dealing more or less directly with municipal matters. The Index is kept up to date, and the month of literature covered each time will be brought up to within two or three days of publication. Our chief object in this is to keep our readers in touch with all the current literature on municipal matters. In furtherance of this we will furnish any of the articles listed in the index for the price named after each article, except that where an article is continued in two or three issues of the paper, the price given is for each of said issues. In addition to the titles where these are not sufficiently descriptive or where the article is of sufficient importance, a brief statement of its contents is added. The length also is given, and the name of the author when it is a contributed article.

ROADS AND PAVEMENTS.

Highways:

Hamilton Entrance of Toronto-Hamilton Highway. Present route has dangerous curves and bad grades. Discussion of the merits of three alternative routes, two of which call for bridges and one of which requires a fill. By E. Howard Darling. 5 ills., 1,500 words. Canadian Engineer, July 13. 15 cts.

State:

Organization of Road Administration for Michigan. County road system and state highway organization. 1,500 words. Better Roads and Streets, July. 15 cts.

Review of New York State Work for 1915. From address by H. E. Breed, state highway commissioner. 1 ill., 6,000 words. Better Roads and Streets, July. 15 cts.

The Ohio State Highway Department. Bureau of construction; engineering and inspection; bureau of tests; work during 1915. By George D. Steele. 1 ill., 5,000 words. Better Roads and Streets, July. 15 cts.

Construction:

Practical Street Construction—Grade at Intersection. Discusses the difficulties of adjusting elevations of roadways, curbs and building lines where streets of different grades intersect. Possible variations from standard practice by which extreme conditions may be provided for are considered. 4 ills., 1,000 words. Municipal Journal, July 6.

Practical Street Construction—Intersection Grades. Discusses the principles to be followed in fixing elevations of curbs and property lines. Limits to departures from standard grades, cross-slopes and curb heights. Solves and explains a typical case. 2 ills., 1,000 words. Municipal Journal, July 13. 10 cts.

Practical Street Construction—Intersection Grades. Calculates an extreme case of heavy grades at an oblique intersection. Discusses the effect of vertical curves on elevations. Intersections of streets of minor importance. Temporary sidewalk construction. 1 ill., 1,500 words. Municipal Journal, July 20. 10 cts.

Practical Street Construction—Gutters. Their purpose; solidly set gutters vs. cobble. Dish gutters, ditch gutters, width of gutter and special treatment are discussed in this article. 2 ills., 1,200 words. Municipal Journal, July 27. 10 cts.

Earth Handled Cheaply in Grading Utah Roads. Graders hauled by gasoline tractors moved earth for 7.5 cts. per cubic yard. 3 ills., 800 words. Engineering News, July 6. 15 cts.

Steam Shovels Removes and Loads Old Pavement and Foundation. Granite block pavement being laid on Broadway, Brooklyn, to replace worn out wood block. Joints are made with tar and sand. 3 ills., 1,250 words. Engineering Record, July 8. 15 cts.

Maintenance:

Macadam Road Maintenance. Contains very valuable suggestions in connection with the upkeep of this type of roadway. By W. H. Huber. 4,000 words. Canadian Engineer, July 6. 15 cts.

Cost of Maintaining New York State Highway. Details the costs involved in the maintaining of the state highways of New York. The article deals with the various types of pavement in use under the system. By F. W. Sarr, Second Deputy Commissioner. 4,500 words. Canadian Engineer, June 29. 15 cts.

The Care of Earth Roads and Split Log Drag. Discusses the maintenance and construction of various types of earth roads. By W. H. Losee. 3,500 words. The Municipal World, July. 10 cts.

Asphalt:

The Fluxing of Asphalt. Discussion of the various methods of fluxing and their relative merits. By F. P. Smith. 2,700 words. Canadian Engineer, July 27. 15 cts.

Laying an Asphalt Pavement in Baltimore. A critical analysis of methods used. Substantial but cheap pavements of this character are being laid. Motor trucks are used for hauling asphalt. By Daniel J. Hauer. 1 ill., 1,100 words. The Contractor, July 15. 20 cts.

Bitulithic:

Bitulithic Pavement Laid Over Old Gravel. Construction methods explained and costs given for 5-mile section near Tacoma, Wash. Work was done by contract at a cost to the county of $1.445 per square yard. By D. H. White, County Engineer. 2 ills., 1,100 words. Engineering Record, July 1. 15 cts.

Bituminous:

Recent Developments in Bituminous Pavements. Discusses both bituminous macadam and bituminous concrete. Author attempts to reduce to some system the nomenclature of bituminous pavements, of which there are many varieties. By A. H. Blanchard. 6,000 words. Municipal Engineering, June. 25 cts.

Brick:

Essential Details of the Construction and Maintenance of Brick Pavements. Mortar bed; expansion joint; sand in the grouting mixture; methods of maintenance. From a lecture by W. A. Howell. 5,000 words. Better Roads and Streets, July. 15 cts.

Standard Paving Block Specifications. Proposed tentative specifications issued by the American Society for Testing Materials. 1,500 words. Canadian Engineer, July 6. 15 cts.

Concrete:

Concrete Roads Develops Three Cracks in a Year. Pavement in Fostoria, Ohio, with joints 100 feet apart shows only one crack directly traceable to contraction. 1,200 words. Engineering Record, July 15. 15 cts.

Concrete Road Construction in Maryland. Description of methods and equipment used in excavating and in placing concrete. 2 ills., 2,200 words. The Contractor, July 1. 20 cts.

Building Concrete Roads. Gives an account of some failures to obtain best results, explains the reasons for them, and shows how the mistakes were corrected in later design and construction. By H. P. Cumings, County Engineer. 5,500 words. Municipal Engineering. 25 cents.

Sioux City Concrete Pavements. City has forty miles of concrete paved streets and roads that have shown remarkable results in freedom from cracking and resistance to wear. These pavements are laid in a different manner from that followed elsewhere. 9 ills., 3,900 words. Engineering News, July 27. 15 cts.

Granite:

Granite Block Paving. Quarrying, cutting and laying of granite blocks. Standard methods. 1,800 words. Stone, July. 15 cts.

Gravel:

Gravel Roads Constructed in Northwestern Michigan. Describes the method of construction and maintenance. From a paper by N. H. Nielsen. 1,500 words. Engineering and Contracting, June 28. 10 cts.

Harrowing Highly Important in Gravel Road. Describes construction of gravel roads by feather-edge methods. 1,200 words. Engineering Record, July 15. 15 cts.

Macadam:

Stone as Road Material. Suggestions regarding a highway system for Canada. By J. S. Wilson. 1,200 words. Canadian Engineer, July 20. 15 cts.

The Glutrin Bound Highway. Discusses the advantages, which include inexpensiveness and ease of application, and the disadvantages which seem to be few. By C. J. Knisely. 4 ills., 3,000 words. Municipal Engineering, June. 25 cts.

Wood Block:

Treated Wood Block Flooring. Points concerning the use of wood block for flooring purposes where heavy trucking makes maintenance a serious problem. By C. H. Teesdale. 1,800 words. Canadian Engineer, June 29. 15 cts.

Oiling:

Methods and Costs of Treating Old Macadam Strees in Milwaukee, Wis., with Asphaltic Oil. Gives some costs. By Stanley E. Bates. 4 ills., 1,200 words. Engineering and Contracting, July 5. 10 cts.

Finance:

Financing Street Paving. Review of several methods of assessment results in favoring the plan of local assessments. 3,000 words. Pacific Municipalities, July. 25 cts.

Prorating Paving Cost Among Property Owners. Describes the practice developed in Owensboro, Ky. Gives typical assessment sheets. By H. M. Talbott. 2 ills., 1,200 words. Engineering News, July 6. 15 cts.

Fees for Use of Public Streets. A list of the charges made in Baltimore for permits, privileges, rents and licenses. 500 words. Municipal Journal, July 13. 10 cts.

Comparative Cost of Various Types of Pavements. Interesting figures from a paper by E. W. Stern, chief engineer of highways, Manhattan Boro. 2,500 words. Engineering and Contracting, July 5. 10 cts.

Street Signs:

Selection and Placing of Street-Name Signs. Discusses the size and style of letters; the color, location and number of signs and height above street; construction, durability and cost; wood, glass and metal signs; matter on signs. 14 ills., 3,700 words. Municipal Journal, July 27. 10 cts.

Miscellaneous Street Signs. Describes some interesting signs found in various cities. 10 ills., 800 words. Engineering News, July 6. 15 cts.

Simple Post for Street Name Signs. Describes simple pipe sign used in Portland, Ore. By R. S. Wallis. 2 ills., 800 words. Municipal Journal, July 6. 10 cts.

Miscellaneous:

Test Roads in Philadelphia. Describes the present condition of several sections of a service test road built three years ago and gives the necessary repairs and costs of maintenance. Also describes a concrete test road built with and without bituminous wearing surfaces. Gives costs of construction of concrete road. 3 ills., 3,000 words. Municipal Journal, July 6. 10 cts.

Limitations of Tests Which Define the Essential Properties of Stone Block, Paving Brick, Wood Block and Cement Concrete when used in pavement. 9,000 words. Better Roads and Streets, July. 15 cts.

Adaptability of Paving Materials to Different Conditions and Localities. From a paper by F. C. Pillsbury, division engineer, Massachusetts Highway Commission. 3,500 words. Surveyor, June 16. 40 cts.

Report of Committee on Road Materials of the American Society for Testing Materials. 4,500 words. Better Roads and Streets. July. 15 cts.

Changes in Specifications for Paving in St. Louis. Discusses changes for brick and bituminous macadam pavement and old brick pavements surfaced with asphalt. 1,300 words. Engineering News, July 13. 15 cts.

Planning Boards for Philadelphia Highway Bureau. Maps mounted on boards give graphic presentation of status of work of Bureau of Highways from day to day. 750 words. Municipal Journal, July 13. 10 cts.

Plank Roadway Laid Across Shifting Desert Sand. Road near Holtville, Cal., built of units assembled in yard and when placed, surfaced with oil and sand. 4 ills., 1,200 words. Engineering Record, July 29. 15 cts.

The Regulation of Different Classes of Traffic on Public Highways. Continued from the June issue. By Edwin Duffey, New York State highway commissioner. 3,000 words. Better Roads and Streets, July. 15 cts.

British Nomenclature for Tars and Bitumens. Report of engineering standards committee. Tars and pitches considered as distinct from bitumens and asphalts. 1,000 words. Municipal Journal, July 6. 10 cts.

SEWERAGE AND SANITATION.

Treatment:

Tests Show Activated-Sludge Process Adapted to Treatment of Stock Yards Waste. Armour & Co.'s engineers report oxidation complete in 18 days. Loss of nitrogen in effluent. The methylene-blue test gave negative result after two days' aeration and long before effluent was clear. 2,900 words. Engineering Record, July. 15 cts.

Air-Diffuser Experiences with Activated Sludge Tanks. Porous block and perforated pipe diffusers for distributing air in sewage being treated in activated sludge tanks are discussed by engineers in charge of 7 different plants. 5,400 words. Engineering News, July 20. 15 cts.

Sheffield Sewage Disposal Works. Description of the plant. Experimental work with reference to the purification of sewage by aeration, activated sludge, etc. 4,000 words. The Surveyor, July 14. 40 cts.

Final Report on Elmhurst Disposal Plant. Describes operation of Landreth electrolytic Sewage disposal plant at Elmhurst, L. I. 1,300 words. Engineering News, July 13. 15 cts.

Experience With Fine Grain Filters. By W. H. Makepeace, sewage engineer to the county borough of Stoke-on-Trent. 1,800 words. Surveyor, July 14. 40 cts.

Results of First Year's Experiments with Small Sewage Treatment Plants by U. S. Public Health Service. Describes the results of experimental work in connection with the use of Imhoff tanks and sand beds combined. From a paper by L. C. Frank. 3,500 words. Canadian Engineer, June 29. 15 cts.

Artificial Means of Sewage Treatment. Discusses the various means of treatment and their efficiency. Comparison of results of the various methods. Costs. From a paper by Harrison P. Eddy. 5 ills., 9,000 words. Engineering and Contracting, June 28. 10 cts.

The Purification of Wastes from the Finishing of Woolen Goods. An outline of the work and results obtained by experiments on the treatment of woolen mill wastes in New England. By H. R. Crohurst and A. D. Weston. 6,000 words. Chemical Engineer, July. 20 cts.

Separate Sludge Digestion Improves Imhoff Tank Operation by Keeping Sewage Fresh. Auxiliary chamber provided; two pumps simultaneously force fresh and decomposed sludge into one pipe to secure mixing. By Dr. Karl Imhoff. 1 ill., 2,500 words. Engineering Record, July 22. 15 cts.

Sewage-Testing Station Report Limits Processes. Greenhouse sludge treatment defined in Cleveland report, grit chamber velocities determined, roughing filters found inadequate and minimum mesh of screen learned. 1,800 words. Engineering Record, July 15. 15 cts.

The Sewage Problem. Discusses the latest developments and possibilities of the future. By Dr. Sidney Barwise. 3,200 words. The Surveyor, July 14. 40 cts.

Bridgeburg Sewage Disinfecting Plant. Description of the plant and methods of operation. Plant is very costly per capita. 2 ills., 1,100 words. Canadian Engineer, July 6. 15 cts.

Sarnia, Ontario, Sewage Disposal. Report showing probable cost of disposal plant. 1,000 words. Canadian Engineer, July 20. 15 cts.

Sewers:

Gantry Cranes Work on Sewer at Salt Lake City. Four miles of 30 to 78-inch lock-joint reinforced concrete pipe. Excavation to depth of 6 to 8 feet by teams; then by electrically-operated clam shell and orange peel buckets. 1 ill., 500 words. Engineering News, July 20. 15 cts.

Some Plant and Methods for Large Size Brick Sewer Construction in Chicago. Division and character of work; plant and methods. 9 ills., 1,400 words. Engineering and Contracting, July 12. 10 cts.

Notes on Methods and Cost of Making Surveys for Sewers. By A. N. Wolf. 1,000 words. Engineering and Contracting, July 12. 10 cts.

Miscellaneous:

Kansas Experience in Running Small Sewage Works. The need and economy of efficient supervision of small sewage disposal plant is shown by Kansas experience with plain and two-story septic tanks, contact beds and their dosing devices. By F. M. Veatch. 2,500 words. Engineering News, July 13. 15 cts.

Standard Sewerage Units. Discusses standard units for sewer construction as advocated by the A. S. M. I. 1,700 words. Municipal Journal, July 13 and 20. 10 cts. each.

WATER SUPPLY.

Waterworks:

Waterworks in the Larger Cities. Various items of information relative to municipally owned plants in cities of more than 30,000 population. Sources of supply, kinds of power used and methods of purification. 1,200 words. Municipal Journal, July 6. 10 cts.

Waterworks of Canada. Some data concerning capital and operating costs of the waterworks plants in Canada. 800 words. Canadian Engineer, July 20. 15 cts.

Difficulties in the Designing and Operation of Medium-Sized Waterworks Plants. A town of 1,000 to 5,000 inhabitants can now build a waterworks system with as little trouble in finance as was formerly experienced in towns of 50,000 or more. By E. B. Black. 2,000 words. Canadian Engineer, July 13. 15 cts

Seattle Waterworks Improvements. How the problem of increasing the amount of supply from the watershed was solved. Danger of shortage due to a possible break in pipe line was reduced by increasing storage supply in city. Relative reliability and cost of wood stave and steel pipe are considered. 6 ills., 4,000 words. Municipal Journal, July 20. 10 cts.

Leeds Waterworks. Describes the system and the geological dimculties connected with the construction. By C. G. Henzell. 1,500 words. Water and Water Engineering, June 15. 40 cts.

Water Supply for Troops in the Field. Discusses sources of supply and collection and methods of sterilization and purification. Chemical germicides are well adapted for this work. By J. J. Hinman, Jr. 3,500 words. Engineering and Contracting, July 12. 10 cts.

Purification:

Theory and Practice in the Filtration of Water. Conclusions concerning the various methods of filtration; aids to filtration; discussion. Last in a series of articles by Walter Clemence. 3,000 words. Water and Water Engineering, June 15. 40 cts.

Progress of Water Disinfection in Maryland. Outline of the work under control of the state board of health. There are 83 public water supplies in the state. From a paper by R. B. Morse, and Harry R. Hall. 2,500 words. Fire and Water Engineering, July 26. 10 cts.

Water Purification Plants in Large American Cities. Data on Purification processes used by municipal plants in cities of more than 30,000. 1 page. Municipal Journal, July 13. 10 cts.

Pipe Lines:

Recommends Steel Pipes for 37-in. Water Main 9 2/3 Miles Long at Rochester, N. Y. Report of E. A. Fisher, consulting engineer, makes analysis of alternate proposals for steel and cast iron conduits 37 inches diameter. Specifications for pipe coating embrace new features introduced as a result of experience on similar work. 2,000 words. Engineering Record, July 8. 15 cts.

Data and Discussion on Cast Iron Pipe Joint Tests for the San Francisco High Pressure Fire System. Effects of settlement, pipe chosen, joint design, tests and comparison of joint efficiency. By A. J. Bowie, Jr. 5 ills., 5,000 words. Engineering and Contracting, July 12. 10 cts.

Reservoirs:

Waterworks Reservoirs. Classes, field of usefulness, value of proper location design and difficulties of construction. From a paper by Dabney H. Maury. 2,000 words. Fire and Water Engineering, July 12. 10 cts.

Typical Designs of Circular Reinforced Concrete Reservoirs. Comment on the design of this type of reservoir abstracted from a paper by Dabney H. Maury. 5 ills., 1,000 words. Engineering and Contracting, July 12. 10 cts.

Construction of Hill View Reservoir, Yonkers. Steam shovel excavation, embankment building, extensive concrete paving and trimming, seeding and planting slope of 90-acre artificial reservoir. 6 ills., 2,500 words. Contracting, July. 10 cts.

Water Power Storage Reservoir With Pumping Station. Plant at Bear Lake, Utah, where hydro-electric storage reservoir is boosted by pumping from a nearby source. 5 ills., 1,800 words. Engineering News, July 15. 15 cts.

Pumping:

Air Lift Pumps. Abstract of paper before Iowa Engineering Society by Arthur H. Ford. 1,200 words. Fire and Water Engineering, July 12. 10 cts.

Pumping Machinery Test Duty vs. Operating Results. Abstract of paper by J. N. Chester. 2,000 words. Fire and Water Engineering, June 28. 10 cts.

Difficult Pump Test Made With Pitot Tube. Pitot tube used in spite of high velocity in discharge line and air in connection; special switching device to reverse manometer leads. By C. E. Grunsky. 3 ills., 6,100 words. Engineering News, July 6. 15 cts.

Determining Pump Slip and Rate of Flow Through Pipes by the Use of Pitot Orifices or Tubes. By F. C. Wyse. 2,300 words. Fire and Water Engineering, July 12. 10 cts.

The Use of Oil Engines for Pumping. Describes the series of service tests of various fuel oils for pumping engines. Five different types of fuel were used and a detailed table is given showing the results secured with each of them. From a paper by C. R. Knowles. 3,000 words. Canadian Engineer, June 29. 15 cts.

Cost of Operating a Kansas Pumping Plant. Facilities provided by Fredonia, Kan. Waterworks for operating motor-driven pumps continuously. Itemized cost of operation. By O. H. Horner. 2 ills., 1,000 words. Electrical World, July 1. 10 cts.

Pumping Water for Irrigation. The theory of the flow of wells and the influence and spacing of wells. First in a series of articles. By Louis Schmeer, Irrigation Engineer. 1 ill., 4,000 words. Engineering and Contracting, July 12. 10 cts.

Miscellaneous:

Determination of Maximum Stream Flow. Discussion of value to be assigned to the co-efficient of perviousness of the surface of the watershed when estimating the maximum discharge from a large watershed. By C. E. Grunsky. 2,500 words. Canadian Engineer, July 13. 15 cts.

Stream Flow, Not Rainfall, Best Criterion for Yield of Watershed. Engineers should use river measurements as most reliable basis for water power predictions. 2,400 words. Engineering Record, July 22. 15 cts.

Lining Wells With Cast Iron and Cement Grout. On account of the corrosive character of the water, two large and deep bored wells at Tunbridge Wells, England, were lined with cast iron tubes. The tubes were double in the upper part of the well and filled between with cement grout. 1 ill., 1,000 words. Engineering News, July 27. 15 cts.

Experiences in Freezing of a Subaqueous Main Laid in Salt Water and the Use of Electricity to Thaw Out the Main. Extract from a paper by W. W. Brush. 1,000 words. Engineering and Contracting, July 12. 10 cts.

Plans and Records of Water Distribution Systems. Mains record register; valve location books. Examples of the mains register. By William P. Walker. 1,200 words. Fire and Water Engineering, July 15. 10 cts.

STREET LIGHTING AND POWER.

Street Lighting.

Street Lighting. Discusses the present practice in city lighting in the residential, business and suburban streets, type, spacing and distribution of lighting units and color of light. By H. E. Mahan. 5 ills., 3,000 words. Pacific Municipalities, May. 25 cts.

Economics of Group System of Street Lighting. How a re-arrangement of distribution circuits and transformer

equipment on a $3,750,000 job will affect a material and labor saving of $13.44 per lamp. By Montague Ferry and E. M. Tompkins. 3 ills., 1,500 words. Electrical World, July 22. 10 cts.

Power Plants:

Power System of the Syracuse Lighting Company. This company has one main generating station and several sub-stations which are operated in connection with power purchased from Niagara. By Norman G. Meade. 3 ills., 2,000 words. Power, July 25. 5 cts.

Operating Costs for Municipal Gas-Engine Plant. At the gas-producer plant of the Edmonton municipal station the average cost of producing power at the switchboard, including fixed and overhead charges, was 1.688 cents per k.w. hour for 1914, and 1.513 cents for 1915. By H. T. Melling. 2 ills., 1,500 words. Power, July 4. 5 cts.

Operating Costs for Municipal Gas Engine Plants. Table of costs of operation of gas producers and twin-tandem gas engines at Edmonton. 2 ills., 1,200 words. Canadian Engineer, July 20. 15 cts.

Central Station Steam Heating. Steam heating as a by-product of a municipal light and power plant is not common. Article is of value to many city officials as well as to those operating private plants. By G. C. Pruett, city engineer, Miles City, Mont. 4,500 words. Municipal Engineering, July. 25 cts.

Air Supply Adjustments in Rochester Gas Works Effect Saving of 64 Pounds of Fuel Per Ton of Coal Carbonized. By William H. Earle. 3 ills., 2,000 words. American Gas Light Journal, July 31. 10 cts.

Miscellaneous:

Raising Standards of Electrical Construction. Special features connected with the practical operation of the new municipal electric inspection department of Milwaukee, particularly the cooperation of contractors with inspectors. 5,000 words. Electrical Review, July 22. 10 cts.

The Licensing of Electrical Contractors. A review of the movement for raising the standards of electrical construction by eliminating incompetent and unscrupulous contractors. 2 ills., 3,500 words. Electrical Review, July 15. 10 cts.

Restoration of Gas Mains Over Rapid Transit Tunnels. Describes the difficult problems and their solutions in replacing gas mains in New York City. By J. E. Worsley. 11 ills., 5,000 words. The Gas Age, July 15. 20 cts. 14 ills., 2,500 words. The Gas Age, August 1. 20 cts.

FIRE.

Protection:

New York Fire Department Report for 1915. Abstract of complete and interesting synopsis of the work done by the department in 1915. 1,800 words. Fire and Water Engineering, July 26. 10 cts.

Washington Fire Department. Is well organized and has efficient officers. Pension provisions are small. Loss per fire, annual number of fires and loss per capita low. From a report of the National Board of Fire Underwriters. 2,000 words. Fireman's Herald, July 29. 5 cts.

Fire Service of Somerville, Mass. Report of National Board of Fire Underwriters on department organization and equipment, apparatus and fire alarm system. 1,400 words. Fire and Water Engineering, July 12. 10 cts.

Prevention:

Fire Prevention: A Personal Responsibility. By H. W. Forester. 1,700 words. Safety Engineering, July. 25 cts.

Building Construction as Affecting Fire Risk. By C. F. Wieland. 6 ills., 4,500 words. Pacific Municipalities, May. 25 cts.

Fire Waste and City Planning. Effect of stringent building laws, ample water supply, removal of overhead wires and thorough building inspection. By R. B. Godley, Jr. 1,000 words. Fireman's Herald, July 29. 5 cts.

Motor Apparatus:

Speed of Motor Apparatus. No limitation should be placed on the speed of motor fire apparatus, but competent drivers should be employed. Discussion by W. C. Davol, chief, Fall River, Mass. 800 words. Fireman's Herald, July 15. 5 cts.

The Best Motor for Fire Apparatus. Typical fire apparatus engines. Engines of long stroke and medium speed have been found to be best for heavy work. By Victor W. Page. 2 ills., 3,000 words. Fire and Water Engineering, July 26. 10 cts.

The Best Motor for Fire Apparatus. Discusses the advantages of 4, 6, 8 and 12-cylinder motors; also of the various types of design. By Victor W. Page. 6 ills., 3,000 words. Fire and Water Engineering. June 28, 10 cts.

Miscellaneous:

New York Fire College Extension Course. Questions presented and the answers thereto as officially promulgated for the instruction of the members of the department. Fireman's Herald, 12th installment, 1,000 words, July 1; 13th installment, 1,000 words, July 8; 14th installment, 1,500 words, July 15; 15th installment, 1,500 words, July 22. 5 cts. each.

New York Fire College Extension Course Questions presented and answered. 16th installment, 2,000 words. Fireman's Herald, July 29. 5 cts.

Platoons in Two or More Departments. Pittsburg and Paterson are now under the double-shift, making six cities of over 100,000 population whose fire departments have abandoned continuous duties. Text of the new rule adopted for the Paterson force. 1,500 words. Fireman's Herald, July 22. 5 cts.

Electrical Fires. Causes and method used to extinguish them. By T. J. O'Connor, chief, General Electric Fire Department. 1,000 words. Fireman's Herald. 5 cts.

Lachine's Fire Alarm System. Short description of new storage battery central office equipment. 1 ill., 500 words. Canadian Engineer, July 6. 15 cts.

Irvington's Bungalow Fire House. Designed and built by firemen to conform to the appearance of the surrounding residences. Interior and exterior details. By Haldane White. 1 ill., 1,000 words. Municipal Journal, July 6. 10 cts.

The Advantages of Smoke Helmets to Firemen. From a paper by Louis Behrens, chief, Charleston, S. C., fire department. 1,100 words. Fire and Water Engineering, July 19. 10 cts.

MOTOR VEHICLES.

Motor Truck Lessens Cost of Maintaining Gravel Roads in Alabama. Replaces from 16 to 20 mules for scarifying, makes complete scraping possible after rain and reduces cost of gravel hauling from 30 to 40 cents per yard mile to from 7 to 11 cents. Truck drawing three machines makes 30 miles a day. By T. H. Edwards, county engineer. 6 ills., 1,000 words. Engineering Record, July 15. 15 cts.

Conveying Concrete by Motor Truck. Description of some work in Detroit. By H. E. Kitchener. 1 ill., 700 words. Engineering and Contracting, July 26. 10 cts.

Motor Trucks Economical on a Short Haul. Chicago contractor demonstrates that trucks are money savers when the distance moved is only a few blocks. Detailed costs of hauling and running expenses are given. By Stanley E. Bates. 3 ills., 1,000 words. The Contractor, July 15. 20 cts.

Motor Trucks for Earth Excavation for the Public Terminal at Newark, N. J. Gives cost and amount of work done by the trucks. 1 ill., 1,000 words. Engineering and Contracting, July 5. 10 cts.

Overhead Line Maintenance Trucks of the Third Avenue system. The writer describes various types and capacities of gasoline motor trucks, modifications in them developed by experience, valuable special uses, means of checking operations and facilities for maintenance. By J. D. Kent. 19 ills., 5,000 words. Electric Railway Journal, July 15. 10 cts.

Trailers:

Trailers with Motor Trucks. Letter and discussion on article which appeared previously, which discussed feasibility and economy of motor trucks and trailers. This letter challenges some of the former statements. 2,400 words. Engineering Record, July 1. 15 cts.

Design:

Refinement in Truck Design. Discusses front and rear axles, radiators, governors, engine speeds and truck speeds. By H. D. Church, Packard Motor Car Co. 6 ills., 4,000 words. The Automobile, July 6. 10 cts.

CITY PLANNING.

Excess Condemnation and City Planning. An argument for taking more land than is needed for a public improvement for the purpose of preventing remnants and giving the city the benefit of the enhanced value of the excess taking. A number of the arguments are illustrated by examples from a Pacific coast city. By Charles K. Mohler. 5 ills., 1,900 words. Engineering News, July 6. 15 cts.

Shrewsbury Housing Schemes. Gives details and approximate cost. By A. W. Ward. 6 ills., 1,000 words. Surveyor, June 23. 40 cts.

STREET CLEANING AND REFUSE DISPOSAL.

Street Cleaning:

Cleveland Street Railway Flushes City Streets. Car with tank holding 4,480 gallons cleaned 4,850 ft. on one side of the street with one filling of the tank in 12 minutes. By H. C. Ebeling, engineer, Cleveland Railway. 1 ill., 800 words. Engineering Record, July 8. 15 cts.

Cleveland Pays Railway to Flush Streets. Plan whereby the Cleveland Railway flushes the city streets and a description of the flusher provided for this purpose. By H. C. Ebeling. 3 ills., 1,200 words. Electric Railway Journal, July 8. 10 cts.

The Gas-Electric Suction Street Sweeper. Describes the construction, operation and results of the Way-cleanse sweeper, which marks a decided step in advance over the methods of collecting by hand broom and horse-drawn sweeper. By W. S. Leggett. 9 ills., 1,500 words. General Electric Review, August. 20 cts.

Snow, Removal:

Prompt Snow Removal in Philadelphia. Gives the results of plans for being at all times during the winter in a state of preparedness for the contests with snow which, if successful, result in comfort to the inhabitants of the city. By William H. Connell. 8 ills., 2,500 words. Municipal Engineering, June. 25 cts.

Snow Removal in Montreal. Chief Engineer of the city describes department organization and methods adopted. 2000 words. Canadian Engineer. July 27. 15 cents.

Garbage Disposal:

Garbage Collection in St. Louis. Nature and extent of municipal service. The garbage is delivered to a private reduction company, which is paid for removing it. The wagons are manufactured by the city. Force and equipment employed and system of keeping records. By F. G. Pulley. 2 ills., 1,650 words. Municipal Journal. July 13. 10 cents.

Five Thousand Hogs Eat Denver's Garbage. Successful garbage disposal by feeding to pigs depends upon the success of the piggery. The contributory factors are immunization from cholera, a balanced ration and a contented animal. By-products of the process are silverware for hotels, bone meal and development of a commercial serum plant. 4 ills., 1,800 words. Engineering Record. July 29. 15 cents.

GOVERNMENT AND FINANCE.

Finance.

Municipal Supply Department—the Purchasing Agent. The third in a series of articles. This is devoted to the person who acts as central control of requisition and materials to supply the demand. By H. M. Foster. 3,500 words. Municipal Engineering. July. 25 cents.

Storehouse Methods That Reduce Labor. Description of a unique system of arranging stock and keeping storehouse and accounting records which has greatly increased efficiency. By W. V. C. Bulkley. 3 ills., 2,500 words. Electric Railway Journal. July 15 10 cents.

Financing Utilities Operating Under State Control. Discusses public utilities commission law, capitalization, earnings, expenses and fair rate of return. From a paper by Chester P. Wilson. 7,000 words. The Gas Age. July 15. 20 cents.

How to Appraise Public Utility Property. Some important points to be borne in mind about planning appraisals, handling company records and designing forms. By G. W. Kuhn 4,500 words. Electric Railway Journal. July 15. 10 cents.

Investment per Revenue Passenger and Density of Traffic. The author analyzes the relation between electric railway investments and traffic density on the basis of his suggested unit of investment per revenue passenger. By D.

J. McGrath. 5 charts. 1,500 words. Electric Railway Journal. July 8. 10 cents.

Grand Rapids Budget System. City's activities are classified under 29 departments. The detailed budget ledger described. Weekly checks on budget balances. By Chester W. Shafer. 2,300 words. Municipal Journal. July 20. 10 cents.

Government:

How to Train Young Engineers as Managers. Submits a definite collegiate course in management training. By Jos. W. Roe 4,200 words. Engineering Magazine. July. 25 cents.

TRAFFIC AND TRANSPORTATION.

Jitneys in British Columbia. They were largely the product of business depression and are not now very profitable. Regulation was slow in coming and is being laxly enforced. 4,500 words. Aera. July. 25 cents.

Street Railways.

San Francisco Municipal Railway System Without Exposition Traffic. Comparison of figures for fiscal year 1915 with those of the first four months of 1916. 2,000 words. Electric Railway Journal. July 22. 10 cents.

Cleveland Completes Two More Railway Terminals. Permanency and architectural attractiveness govern the design of the station building. Loop-yard tracks were adopted for car storage purposes. 6 ills., 1,200 words. Electric Railway Journal. July 22. 10 cents.

How to Treat the Public. During the past year a special series of talks on the duties of train men to passengers has been given to the trainmen of St. Paul and Minneapolis. 4,000 words. Electric Railway Journal. July 22. 10 cents.

MUNICIPAL WORKS.

What Constitute Municipal "Public Works." How courts have defined the term in its application to streets, sewers, waterworks, street lighting and other utilities. By John Simpson. 1,700 words. Municipal Journal. July 27. 10 cents.

Municipal Works of Interest in Sutton. By W. Hedley Grieves. 3,500 words. The Surveyor. June 16. 40 cents.

Municipal Ice Plant in LaFayette. Short description of a 7½-ton plant in Alabama city. 400 words. Municipal Journal. July 13. 10 cents.

Public Abattoirs: A Comparison of British and Continental Practice. Discusses design and recent innovations. By H. A. Brown. 2 ills., 2,000 words. The Surveyor. July 14. 40 cents

BRIDGES AND DAMS.

Bridges:

Pretoria Avenue Bridge. Contains details of construction and method of operation of new direct lift bridge at Ottawa. By L. McLaren Hunter. 2 ills., 1,000 words. The Canadian Engineer. July 6. 15 cents.

Erection of the Quebec Bridge. Comparison with other great bridges, elaborate preparatory work, temporary high steel viaduct false work and improved method of assembling anchor arm span. 5 ills., 4,000 words. Contracting, July. 10 cents.

Military Ponton Bridges Used in the United States Army. Outline of various forms of bridge equipment standards in the U. S. army and the National Guard. By Percy Barbour. 4 ills., 1,200 words. Engineering News, July 27. 15 cents.

Finished Deep Bridge Sub-Structure, Designed to Reduce Work Under Water, Ahead of Time. Building deep foundations. Unusual plant employed includes driver 122 feet high whose leads overhang full width of cofferdams. Large floating concrete plant and removable cofferdams used several times and handled by 50-ton floating crane. By Frank Cortelyou 8 ills., 3,000 words. Engineering Record, July 8. 15 cents.

Aerial Tramway as Substitute for a Bridge. A two-span cable tramway carries passengers across the river. Method of erecting 1,890-foot cable described. 1 Ill., 1,700 words. Engineering News, July 6. 15 cents.

Temperature Stresses in a Series of Concrete Girder Spans Under Different Conditions of End Support. From a paper by T. D. Gregg. 2 ills., 1,500 words. Canadian Engineer, June 29. 15 cents.

The Economical Section for Short Span Reinforced Concrete Arches Carrying Light Highway Loading. By C. B. McCullough. 1 ill., 2,500 words. Engineering and Contracting, July 26. 10 cents.

The Analysis of the Continuous Arch by the Elastic Method. Considers loads and allowable stresses as well as points in the design of arches. By Prof. Horace R. Thayer. 11 ills., 23 pages Journal of the Engineers' Club of Baltimore, July. 25 cents.

Types of Concrete Culverts for Economical Highway Service. Gives standard drawings and designs for concrete culverts of various sizes and types. 11 ills, 1,000 words. Concrete, July. 15 cents.

Special Plant Layout Expedites Construction of Brooklyn-Brighton Viaduct. Efficient handling of material increases capacity of the plant. Economy in erection through the use of adjustable steel arch centering. 4 ills., 1,500 words. Engineering Record, July 1. 15 cents.

Dams.

Large Roller Crest Dam, Grand Valley Project, Colorado. Details of design of the largest steel roller crest dam in this country. By F. Teichman. 6 ills., 2,100 words. Engineering News, July 6. 15 cents.

MATERIALS OF CONSTRUCTION.

Waterproofing Concrete. Summary of present practice in securing water tightness by grading aggregate, mixing in special preparations, surface washes and surface coatings. 1,500 words. Municipal Journal, July 6. 10 cents.

A Summary of 20,000 Tests of Concrete. Abstract of report issued by the Bureau of Standards. Conclusions are drawn. 1,200 words. Engineering and Contracting, July 26. 10 cents.

Increasing Use of Blast Furnace Slag as Concrete Aggregate. Discusses the physical and chemical composition, gives results of tests of slag concrete and discusses its use. 9,000 words. Concrete, July. 15 cents.

New Cement Specifications — the Changes Made and the Reasons Therefor. Explanation of the requirements which are expected to receive general approval and become the single standard for the country. By R. J. Wig. 3,000 words. Engineering Record, July 15. 15 cents.

Chemistry of Portland Cement. Gives a review of the chemistry and mechanical part of the manufacture of Portland cement. 2,000 words. Met. & Chem. Engineering, July 1. 25 cents.

Efficient Plant Used in Excavating Gravel for Road Work. In many states there is a profitable field for the sale of gravel for use in gravel and gravel-macadam roads. This article gives a full description, with cost data, of the arrangement and operation of a small and efficient plant. By Stanley E. Bates. 6 ills., 4,500 words. The Contractor, July 1. 20 cents.

The Case for Steel Pipe. A discussion of the value of wrought iron steel pipe and result of investigation on corrosion. 4,000 words. American Gas Light Journal, July 3. 10 cents.

MISCELLANEOUS.

Surveying:

City Surveying: Methods of resurveying built-up and surveying undeveloped territory. Describes field and office work methods, making maps and profiles and paving maps. Method of staking out vertical curve. By John McNeal, city engineer, Columbia, S. C. 3 ills., 4,300 words. Municipal Journal, July 13. 10 cents.

Surveying and Laying Out New York State Militia Encampment. With the 22nd engineers at Camp Whitman, New York. Describes work which engineers were called upon to do. Included the installation of a water supply system, including sinking the wells, laying pipe and installing tanks. Sanitary survey was made. Transit and stadia used for surveying camp grounds. By R. K. Tomlin, Jr. Engineering Record, 23 ills., 3,000 words. July 1. 15 cents.

Surveying 1,000 Square Miles With the Camera. Photographical survey covers 93 square miles per month at a cost less than that of plane-table work. 1 ill., 1,200 words. Engineering Record, July 22. 15 cents.

Precise Level Survey of the City of Portland. With a city area of over 65 square miles and over 1,000 feet difference of elevation due to hilly country, Portland, Ore., lacked bench marks. In a comprehensively planned survey over 2,000 bronze tablets and iron pipe bench marks were set, their elevations determined by precise levels and a full list published. The cost was about $4 per bench mark. By W. P. Hardesty. 3 ills., 3,200 words. Engineering News, July 13. 15 cents.

Miscellaneous:

California Cities in the New Census Report. Statistics on number and pay of policemen, on water supply systems and on forms of government. By J. H. Quire. 1,800 words. Pacific Municipalities, July. 25 cents.

The Success of an Unique Experiment by New York state cities. A review of the organization and work accomplished by the New York State Conference of Mayors and the Bureau of Municipal Information. By William Capes, director. 3,000 words. Pacific Municipalities, July. 25 cents.

The Value of Whole-Time Health Officers. Statistics concerning salary and work done by city health officers in Washington. By Dr. Thomas Tuttle. 2,400 words. Washington Municipalities, July. 25 cents.

Temporary Pipes Along Curb and on Trestles Over Street Carry Good Part of New York City's Gas Supply During Subway Construction. No mains are left alive in great excavations under street decking; all lines are by-passed to prevent damage from cave-ins and slides. By C. N. Green. 5 ills., 3,000 words. American Gas Light Journal, July 17. 10 cents.

Subsurface Congestion Has Become an Active Problem in New York. The condition is steadily growing worse with 1,450 miles of gas mains in New York city proper. Average maintenance costs are about $516 and congested conditions make for an increased expense. By C. N. Green. 2 ills., 2,500 words. American Gas Light Journal, July 24. 10 cents.

Smoke Abatement at a Dayton Power Plant. Objectionable smoke was reduced from 18 to less than 1½ per cent in 24 hours with less fluctuation in steam pressure and less supervision. By Charles C. Moore. 2 ills., 1,500 words. Power, July 25. 5 cents.

Municipal Research in San Francisco. By F. W. Eckert. 1,800 words. Pacific Municipalities, July. 25 cents.

Excavating for Side Tracks in Baltimore. An analytical description of methods used in operating a steam shovel with comment on same and some suggested improvements. By Daniel J. Hauer. 1 ill., 2,200 words. The Contractor, July 1. 20 cents.

Lights for Night Work. The various styles of contractor's lights and methods of operating them are described; their efficiency. By Daniel J. Hauer. 2,500 words. The Contractor, July 15. 20 cents.

Cutting Haulage Cost in Road Work to 7 cents per ton mile. Describes organization and equipment. By G. N. Lamb. 3 ills., 2,000 words. Engineering and Contracting, July 5. 10 cents.

Municipal War Economies. Some of the ways in which the expenses of a municipality may be reduced without materially reducing the efficiency of its forces. 8,000 words. Surveyor, June 16. 40 cents.

How to Make Oxy-Acetylene Welds. Through years of experience the author has picked up a number of valuable hints leading to good welding practice. Adequate instruction is of prime importance. By Henry Cave. 4,000 words. Engineering Magazine, July. 25 cents.

BOOK REVIEWS

HIGHWAY ENGINEERS' HANDBOOK: By Wilson G. Harger and Edmund A. Bonney. Second Edition. McGraw Hill Book Company. 609 pp. Illustrated. Price $3.

The purpose of this book, as stated in the preface to the first edition, was to collect in a convenient and compact form, information ordinarily required in the field and office practice of road de-

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NEWS OF THE SOCIETIES

Calendar of Meetings.

Aug. 8-11. DOMINION ASSOCIATION OF FIRE CHIEFS. Annual convention, Windsor, Ont. Secretary, James Armstrong, Kingston, Ont.

Aug. 15-18.—FIREMEN'S ASSOCIATION OF THE STATE OF NEW YORK. Annual convention, White Plains, N. Y.

Aug. 16. — CONNECTICUT FIRE CHIEFS' CLUB. Annual convention, Thompsonville, Conn.

Aug. 16-17.—CONNECTICUT STATE FIREMEN'S ASSOCIATION. Annual convention, Thompsonville, Conn.

Aug 16 17.—UNION OF NEW BRUNSWICK MUNICIPALITIES. Annual convention, St. Stephens, N. B. Secretary, J W. McCready, Fredericton, N. B.

Aug. 16-18.—LEAGUE OF WISCONSIN MUNICIPALITIES. Annual meeting, Oshkosh, Wis. Secretary, Ford H. McGregor, Madison, Wis.

Aug. 17-18.—MICHIGAN ASSOCIATION OF CITY CLERKS. Sixth annual convention, Hotel Wenonah, Bay City, Mich.

Aug. 17-19.—TEXAS GOOD ROADS ASSOCIATION. Annual meeting, Modina Lake, San Antonio, Tex. Secretary, D. E. Colp, San Antonio, Tex.

Aug. 21-23.—UNION OF CANADIAN MUNICIPALITIES. Sixteenth annual convention, City Hall, Montreal.

Aug. 21-27.—PACIFIC COAST ASSOCIATION OF FIRE CHIEFS. Annual convention, San Diego, Cal.

Aug. 22-24.—UTAH STATE FIREMEN'S ASSOCIATION. Annual convention, Salt Lake City, Utah.

Aug. 22-25.—INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS. Annual convention, Baltimore, Md. Secretary, Clarence R. George.

Aug. 23-25.—UNION OF NOVA SCOTIA MUNICIPALITIES. Annual convention, Halifax, N. S. Secretary, Arthur Roberts, Bridgewater, N. S.

Aug. 23-25.—VIRGINIA STATE FIREMEN'S ASSOCIATION. Thirteenth annual convention, Harrisonburg, Va. Secretary, J. E. Glenn, Harrisonburg.

Aug. 28-31.—NATIONAL TAX ASSOCIATION. Tenth annual conference, Indianapolis, Ind.

Aug. 29-31.—LEAGUE OF CITIES OF THIRD CLASS IN PENNSYLVANIA. Seventeenth Annual Convention, Johnstown, Pa. Secretary, Fred H. Gates, City Clerk, Wilkes-Barre, Pa.

Aug. 29-Sept. 1. INTERNATIONAL ASSOCIATION OF FIRE ENGINEERS. Annual convention, Providence, R. I. Secretary, James McFall, Roanoke, Va.

Sept. 4-8.—SOUTHERN APPALACHIAN GOOD ROADS ASSOCIATION. Ninth annual convention, Lexington, Ky. Secretary, Dr. Joseph Hyde Pratt, Chapel Hill, N. C.

Sept. 6-9.—LEAGUE OF AMERICAN MUNICIPALITIES. Annual convention, Newark, N. J.

Sept. 11-16.—KANSAS STATE FIREMEN'S ASSOCIATION. Annual convention, Topeka, Kans.

Sept. 13-15.—NEW ENGLAND WATER WORKS ASSOCIATION. Convention, Portland, Me. Secretary, Willard Kent, Narragansett Pier, R. I.

Sept. 13-15. — WASHINGTON STATE ASSOCIATION OF COUNTY COMMISSIONERS. Annual meeting, Tacoma, Wash. Secretary, J. C. Hansen, Port Angeles, Wash.

Sept. 18-20.—ILLUMINATING ENGINEERING SOCIETY.—Annual Convention, Philadelphia, Pa. Asst. Secretary, C. D. Fawcett, 29 West 39th street, New York City.

Sept. 19-21.—LEAGUE OF IOWA MUNICIPALITIES. Nineteenth annual meeting, Dubuque, Ia.

Sept. 20-22.—MASSACHUSETTS STATE FIREMEN'S ASSOCIATION. Annual convention, Gloucester, Mass. Secretary, D. Arthur Burt.

Sept. 26-28.—LEAGUE OF VIRGINIA MUNICIPALITIES. Annual meeting, Clifton Forge, Va. Secretary, Luther C. Brinson, Portsmouth, Va.

Oct. 2-6.—PLAYGROUND AND RECREATION ASSOCIATION OF AMERICA. Congress, Grand Rapids, Mich. Secretary, H. S. Braucher, 1 Madison avenue, New York City.

Oct. 9-11.—NATIONAL HOUSING ASSOCIATION. Annual meeting, Providence, R. I. Secretary, Lawrence Veiller, 105 East 22d St., New York City.

Oct. 9-13.—AMERICAN ELECTRIC RAILWAY ASSOCIATION. Annual convention, Atlantic City, N. J. Secretary, E. B. Burritt, 8 West 40th street, New York City.

Oct. 9-13.—AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS. Twenty-third Annual Convention, Robert Treat Hotel, Newark, N. J. Secretary, Charles Carroll Brown, 702 Wulsin Building, Indianapolis, Ind.

Oct. 11-13.—LEAGUE OF KANSAS MUNICIPALITIES. Annual meeting, Independence, Kan. Secretary, C. H. Talbot, University of Kansas, Lawrence, Kan.

Oct. 16-21.—NATIONAL SAFETY COUNCIL. Fifth Annual Safety Congress, Detroit, Mich. Secretary, W. H. Cameron, Continental and Commercial Bank, Chicago, Ill.

Oct. 17-20.—AMERICAN GAS INSTITUTE. Annual meeting, Chicago, Ill. Secretary, G. G. Ramsdell, New York City.

Oct. 24-27.—AMERICAN PUBLIC HEALTH ASSOCIATION. Annual Convention, Cincinnati, O. Secretary, Prof. Selikar M. Gunn, Boston, Mass.

Nov. 15-16.—NATIONAL CONFERENCE ON UNIVERSITIES AND PUBLIC SERVICE. Third annual conference, Philadelphia, Pa. Secretary, Edward A. Fitzpatrick, Box 380, Madison, Wis.

Nov. 16-18.—FIRE MARSHALS' ASSOCIATION OF NORTH AMERICA. Annual convention, Nashville, Tenn.

Nov. 21-23.—CITY MANAGERS' ASSOCIATION. Annual meeting, Springfield, Mass.

Nov. 22-24.—CONFERENCE ON MUNICIPAL RESEARCH, Springfield, Mass.

Nov. 23-24.—CIVIC SECRETARIES CONFERENCE. Annual meeting, Springfield, Mass.

Nov. 23-25.—NATIONAL MUNICIPAL LEAGUE. Annual convention, Springfield, Mass. Secretary, Clinton Rogers Woodruff, 705 North American Building, Philadelphia, Pa.

Dec. 27-30. — AMERICAN ECONOMIC ASSOCIATION. Annual meeting, Columbus, Ohio. Secretary, A. A. Young, Ithaca, N. Y.

Dec. 27-30.—AMERICAN STATISTICAL ASSOCIATION. Annual meeting, Columbus, O. Secretary, Carroll W. Doten, 491 Boylston street, Boston, Mass.

Dec. 26-31. — AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE. Annual meeting, New York City. Secretary, L. O. Howard, Smithsonian Institute, Washington, D. C.

Jan. 20, 1917.—WESTERN PAVING BRICK MANUFACTURERS' ASSOCIATION, Kansas City, Mo. Secretary, G. W. Thurston, 416 Dwight Bldg., Kansas City, Mo.

Jan. 23-25, 1917.—AMERICAN WOOD PRESERVERS' ASSOCIATION.—Annual meeting, New York City. Secretary, F. J. Angier, B. & O. Mt. Royal Sta., Baltimore, Md.

Feb. 5-12, 1917.—AMERICAN ROAD BUILDERS' ASSOCIATION. Seventh American Good Roads Congress and Eighth National Good Roads Show, Mechanics' Hall, Boston, Mass. Secretary, E. L. Powers, 150 Nassau street, New York City.

American Association of Sanitary Engineering.

The eleventh annual meeting of this society was held at Newark, N. J., Aug. 1-4.

The delegates were welcomed to the city by Dr. William S. Disbrow, president of the board of health, who advocated the project of the engineers getting together to exchange ideas and influence the public to adopt better methods of sanitation, making for better health in the communities of the country.

In his annual address, the president of the association, T. J. Claffy, referred to its accomplishments in placing the work of the sanitary engineer and plumbing inspector on a higher plane and having the work recognized in most of the cities of the American continent. The records of the society, he said, were of invaluable assistance to engineers and health officers charged with the responsibility of examining and approving plans for light, ventilation, plumbing and drainage in buildings and for the proper installation of such accessories in accordance with specifications.

The morning session was devoted to listening to reports of committees on technical subjects. "Standard Specifications for Brass Goods Used in House Drainage" was dealt with by L. A. Cornelius, of Grand Rapids, Mich.; "Explosion of Sewer Gases and Prevention of Entrance of Explosive Mixtures into Sewers" was the subject of a report read by George J. Dehn, of Chicago. A report on the life of various materials used in housedrainage systems, prepared by James Walker, of Waterbury, Conn., was read by the president, Thomas J. Claffy, of Chicago.

After eleven years, the society has acquired in definite shape a basis for standards for building codes. It was one of the original objects of the society to have such a standard fixed and made available for states and cities, and at every meeting it was discussed and referred to committee. William C. Groeniger, state inspector of plumbing in Ohio, presented a skeleton form for the code, which, it was decided, should be urged as a standard when it has been completed. The process will take more time, as it is to be printed and submitted for criticism and revision to boards of health, associations interested in building and sanitation, and health commissioners. The final draft is expected to be submitted at next year's meeting.

In discussing the necessity of sanitary plumbing, Mr. Groeniger drew a word picture of what might happen if a city like Newark were deprived of its plumbing and drainage systems. He urged as a step toward greater cleanliness the rigid enforcement of sanitary regulations compiled on up-to-date understanding of its necessity.

The extension and unification of publicity work making for popular acceptance of sanitary regulations was urged in three papers read by W. C. Groeniger, of Ohio; Thomas J. Claffy, president of the association, and A. E. Hansen, of New York.

Although the papers were on various topics, their themes invariably hinged on the education of the public in the dangers of bad plumbing and drainage of houses, hotels and institutions.

Mr. Groeniger pointed out that plumbing was becoming more exacting year by year, and that the time had passed for the possibility of a journeyman plumber to master the trade by merely working at it day by day. Special sanitary knowledge in the handling of the individual problem in hand, he said, was also necessary to guarantee sanitary work that would insure health and proper protection of property.

All three papers urged in some form the co-operation of local and state organizations with the society, the National Association of Master Plumbers, National Association of Steam Fitters, the Federated Supply Association, various engineering bodies and associations concerned with sewage disposal.

The paper read by the president was prepared by John Heffernan, of Houston, Tex., and told of the difficulty of having a law passed regulating installation of plumbing in that state, owing to the ignorance of the people of its intent, which, he said, was for their protection.

Officers were elected as follows: President, William C. Groeniger, of Ohio; vice-presidents, Louis A. Cornelius, Grand Rapids, Mich.; Thomas J. Farrell, San Francisco; John Joers, Rock Island, Ill.; George R. Stolz, Milwaukee; Jacob Boll, Dallas, Tex.; F. W. Brand, St. Joseph, Mo.; Thomas M. Landers, Richmond, Va.; James R. Walker, Waterbury, Conn.; Thomas J. Lee, Pitsburgh; treasurer, Lawrence J. Lawler, Pittsburgh; board of directors, Thomas J. Claffy, Newark, and Arthur C. Shaver, Pasadena, Cal. The secretary will be appointed by the new president.

The next meeting of the society will be held at Grand Rapids. Tentative dates were fixed for August 14, 15, and 16 of next year. The board of directors was empowered to act on suggestions for the revision of the society's by-laws.

Springfield, Mass., "Municipal Week."

The Convention Bureau of the Board of trade, in co-operation with the Bureau of Municipal Research and the Western New England Chamber of Commerce, has been successful in securing for Springfield, Mass., this fall what will probably be the most important group of conventions ever held in one American city. The National

(*Continued on page 175*)

PROBLEMS CITIES ARE STUDYING WITH EXPERTS

SEWERS have been designed for the village of Kasson, Minn., by J. F. Druar, consulting engineer, St. Paul, Minn.

In planning the construction of a system of storm SEWERS, the city of London, Ontario, had the services of Chipman & Power, consulting engineers, of the city.

Plans and specifications for STREET improvements in Ambridge, Pa., were prepared by J. P. Leaf, engineer, Rochester, Pa.

An extension to its system of WATERWORKS is to be made by the town of Jewell, Ia., Lawrence W. Cox, engineer, 621 Grand avenue, Des Moines, Ia., having completed the plans.

The village of Cobleskill, N. Y., in making extensions to its SEWER and WATER SYSTEMS, had the plans and specifications prepared by H. Roberts, engineer, 112 State street, Albany, N. Y.

Belwood, Pa., is to have a SEWER SYSTEM to cost $30,000, and a SEWAGE DISPOSAL PLANT to cost $12,000. The plans and specifications were drawn up by Harvey Linton, engineer, 1717 13th street, Altoona, Pa.

A number of improvements are projected by the town of Albermarle, N. C., including PAVING, curbing and construction of SEWERS. Anderson & Christie, Charlotte, N. C., were the engineers employed by the city to make plans and specifications.

Miami, Tex., is to have a WATER WORKS SYSTEM and ELECTRIC LIGHT PLANT to cost approximately $25,000. Planning and supervision of construction is in charge of Henry Exall Elrod, consulting engineer, Interurban Building, Dallas, Tex.

A complete improved WATERWORKS SYSTEM, including intake, pumping station, pumps, electric transmission line, cast iron mains, valves, meter and other appurtenance, is to be constructed by the city of Ravenna, O. The plans and specifications were the work of R. Winthrop Pratt, consulting engineer, Hippodrome Building, Cleveland, O.

The village of Oxford, O., is to have a number of new improved STREETS following the preparation of plans by the engineers, the L. A. Boulay Company, 1250 Nicholas Building, Toledo, Ohio.

The serious difficulties in handling the frequent flood conditions of Mill creek in Erie, Pa., are to be ended by a FLOOD CONTROL improvement planned by the city. Farley Gannett, consulting engineer, Harrisburg, Pa., is to prepare the plans and specifications and to supervise the work.

West Park, O., is extending its WATER mains, and Lander Engineering Co., 306 American Trust Building, Cleveland, O., made the plans for the work.

A WATERWORKS system is to be constructed by the village of Wyanet, Ill., from designs made by J. Rollins Gray, engineer, 450 Old Colony Building, Chicago, Ill.

A number of improvements are to be made to the WATERWORKS of Osborne, Kans., from plans drawn up by E. T. Archer & Co., consulting engineers, New England Building, Kansas City, Mo.

In making further additions to its WATER SUPPLY pumping equipment by the installation of two 9-million and one 12-million gallon pumps, Wilmington, Del., had the consulting engineering services of George W. Fuller, 170 Broadway, New York City.

Glasford, Ill., is making improvements to its WATERWORKS from plans prepared by the Fuller-Coult Co., Chemical Building, St. Louis, Mo.

The recent water famine in Bayonne, N. J., which followed the break in the big main, has resulted in an investigation by the city into the causes of the accident. The occurrence has forcibly called the attention of the city to its WATER SUPPLY problems and a comprehensive system of distribution mains is to be planned and the whole situation is to be thoroughly studied. For this work the city has engaged Louis L. Tribus, of Tribus & Massa, consulting engineers, 86 Warren street, New York City.

PERSONALS

Anderson, J. B., a member of the council of Tampa, Fla., has been appointed chief of the Pure Food Department of the city.

Breech, C. W., mayor of Cleburne, Tex., died July 27 after an illness of two years.

Houston, William H., has been elected chief of police of Missoula, Mont.

Hertenstein, Charles, has been appointed a member of the St. Louis, Mo., efficiency board.

Clemmitt, R. L., assistant water engineer, and William Benthall, supervisor of lakes and watersheds, of Baltimore, have resigned.

Markwith, William E., for nine years chief of the Orange, N. J., fire department, died August 1. He had been a member of the department 27 years and was 58 years old.

Maull, G. Clifton, has been elected chief of the Lewes, Del., fire department. William Hendricks has been appointed assistant.

Romaglia, Frank V., clerk of Garfield Borough, New Jersey, has resigned.

Shreve, Ross, city engineer of Tillamook, Ore., has resigned and has been succeeded by H. P. Kerr. Mr. Shreve's resignation took place when the city council appointed one of its members to inspect concrete paving, dismissing an experienced inspector.

Van Deusen, J. A., has been appointed a commissioner of the Board of Public Works of Watertown, N. Y.

Watts, J. C., has resigned as deputy engineer of Troy, N. Y., to become engineer of the Harbor and Dock Commission of the same city. F. X. Bode has been appointed to succeed Mr. Watts.

West, Judson L., who recently resigned as engineer of the port of Seattle, Wash., has sailed for China to become professor of railroad engineering at the Pei Yang University, Feintsin.

Wood, G. N., has resigned as city engineer of Chanute, Kan., to accept a similar position at Douglas, Ariz., where he was formerly assistant city engineer. C. W. Pratt succeeds him.

NEW APPLIANCES

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations.

"DETECTIVE."

A Compass Device for Locating Underground Iron Fittings.

The work of locating valve boxes, stop boxes, manhole covers, service boxes, iron survey pins and similar objects when they are hidden by dirt, grass or snow is troublesome and expensive in the time wasted and the unnecessary digging that is sometimes done. Instead, however, of the more elaborate electrical devices for such locating work the Breece "Detective" utilizes the magnetic needle principle.

The "Detective" is a small compass, the size of an ordinary watch, which is easily carried in the vest pocket. It has a highly magnetized and hardened steel needle, delicately balanced on tempered steel points between two jewelled bearings. It is fitted into a white metal untarnishable case with a silvered dial and a snap-in beveled crystal glass—a patented screw top keeps out the dirt. A soft iron pin, by magnetism, holds the needle free from vibration when it is not in use, thus saving wear on the bearings. It is durable, convenient and always ready for use.

When the instrument is held vertical in a north and south line and free from any surrounding disturbances, the needle will be approximately in a horizontal position or parallel to the earth's surface, due to the earth's magnetism. An iron or steel object will, however, attract one end of the needle so that it gets a "dip." This serves to locate the direction in which the object may be found. In using the "Detective," the operator stands facing either north or south and holds the instrument by the ring, the dial facing east or west. By stooping over and with a long, steady sweep of the arm three feet can easily be covered at a swing. The work is done in strips. The instrument is always swung close to the ground and as steadily as possible.

The instrument is not designed for locating pipe, although under certain conditions it will serve this purpose if the pipe is not located at too great a depth. It will act through brick, dirt, ice, concrete, tar, wood or any other common material covering objects which often need to be located. It has been found of great service and has affected much saving in the work of waterworks and lighting plant superintendents in many cities. The "Detective," which is illustrated in the accompanying cut, was invented and is sold by a practical waterworks man, M. J. Breece, Galion, O.

VALVE OPERATOR.

Automobile Attachment for Quick Closing of Valves.

The quick closing of valves on big water mains in time of emergency is of the utmost importance and may involve hundreds of dollars of damage. It becomes necessary therefore to have ready some device to replace the slow hand closing which requires so much time and labor. The "Valve Operator" is designed for this purpose, doing away with hand closing by getting its power from the automobile which brings it to the scene of the job.

The device consists essentially of three parts: the tripod, the valve key and the wheel attachment, the first named supporting the device firmly and in the right position above the hole; the second operating the valve and the third serving to transmit the power from the automobile wheel.

In operating, the attachment is first made to the wheel. Having jacked up the wheel to be used, the three arms or hooks are placed around the tire, locking the arms in place by means of a cup which is fed against the hup cap of the wheel. By feeding, the axis to which the arms are attached in the

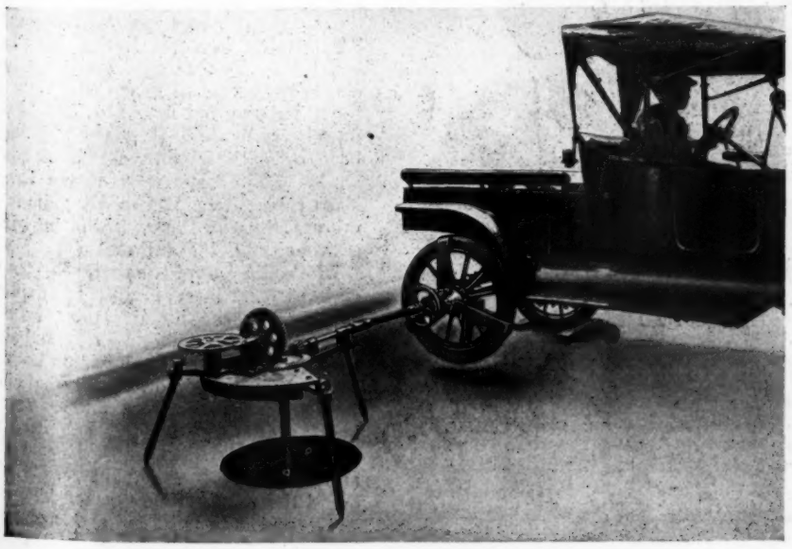
BREECE "DETECTIVE."

center is drawn out, causing the arms to contract against the tire, making the connection rigid. This also centers the drive shaft. These arms are adjustable to any wheel up to and including 36 inches, larger sizes being made to order.

The key is placed on the valve and the tripod set in place. The shaft which connects the wheel with the tripod is a slip joint with a 24-inch adjustment to take up any discrepancies there might be in the center to center dimensions. This shaft is slipped on the projecting shaft ends, with which both tripod and wheel attachment are equipped and pinned. The attaching is now finished, and the power may be applied to close or open the valve.

A counting device is mounted on the tripod, for recording the number of turns on the valve key. By keeping track of this number the operator in the automobile may be kept advised as to the stage of operation, so that he may control the power and speed accordingly. The pins on which the shafts are fastened are light enough to sheer before any material damage can be done to the valve, should the operator be negligent.

In a very satisfactory test in New York City before W. W. Bush, deputy chief engineer of the department of water supply, gas and electricity, and Deputy Commissioner Delos F. Wilcox, a 48-inch gate valve was closed in 18 minutes, including the work of attaching to the automobile. There were 575 turns on this valve and by hand closing



"VALVE OPERATOR," AUTOMOBILE ATTACHMENT.

took four men with a lever one and a half hours. The automobile was a Ford and the power was found to be ample.

The apparatus, as shown in the accompanying illustration, weighs, complete, approximately 150 pounds. It is simple to operate, rapid in action, and durable in construction. It was invented by W. H. Van Winkle, president of the Waterworks Equipment Company, which makes it, 50 Church street, New York City.

DRAINABLE GATE VALVE.

A New Stop and Waste Designed for Capacity.

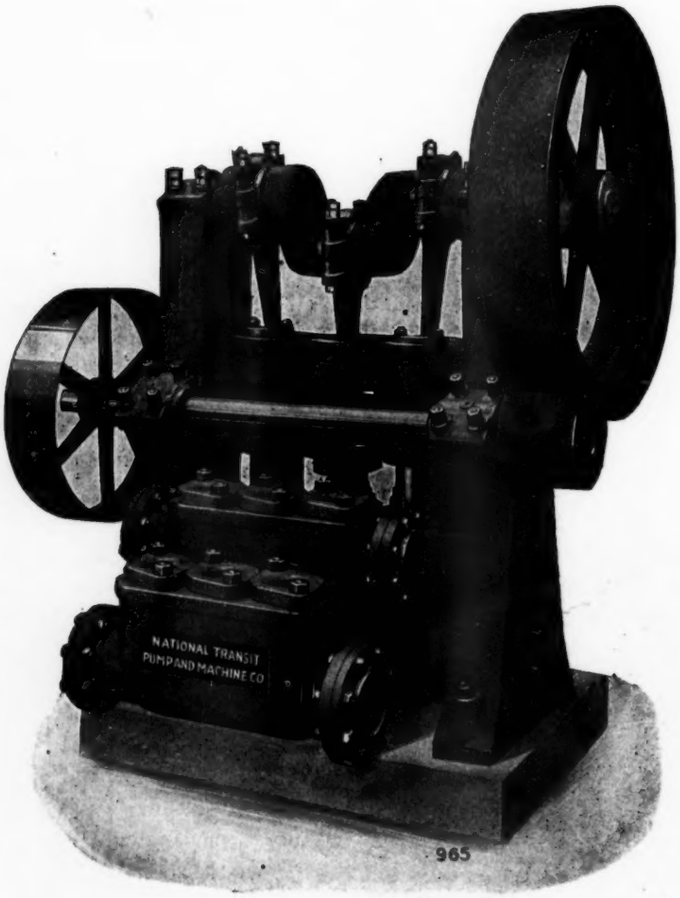
The capacity efficiency of a gate valve is claimed to be increased in the United drainable gate valve. The other special features claimed for this new valve are that it is adaptable to any position; the drain valve is independent of the main valve; the drain water is discharged to its proper place; and both main valve and drain valve open and close easily. One of the most valuable services in which the draining feature can be utilized is when the valve is used as a shut-off just before the water meter, because it gives water service at practically full capacity, and when the water is turned off, the meter can be drained, which preserves the mechanism and prevents freezing.

The United drainable gate valve has a longer body than those of ordinary gate valves, and between the hexagon end and the seat on the delivery side are two threaded drain spuds. One of them carries the draining parts and the other has a watertight cap with washer. These draining parts and the cap are interchangeable, so that the valve can be made drainable from either side.

When the valve is installed, the drain spout can be turned to its most desirable direction, which depends, of course, on the location and position of the valve itself. When the spout is turned in the proper direction, it is firmly locked in that position by means of the lock nut on the spud, which is screwed back tightly against the drain spout part. This prevents the spout from turning while the water is being drained off and prevents also the loosening of any parts, for the stem cannot be screwed outward further than enough to fully open the drain valve. If it should be desirable to carry the drain water off to a catch basin, or other receptacle, the ⅛-inch I. P. thread on the end of the spout will be found very convenient.

All seats are closed by metal to metal contact. The main valve has two separate watertight gates, and each gate is individually hand ground.

The valve, which is shown in part section in the accompanying illustration, is made by the United Brass Manufacturing Company, Cleveland, O.

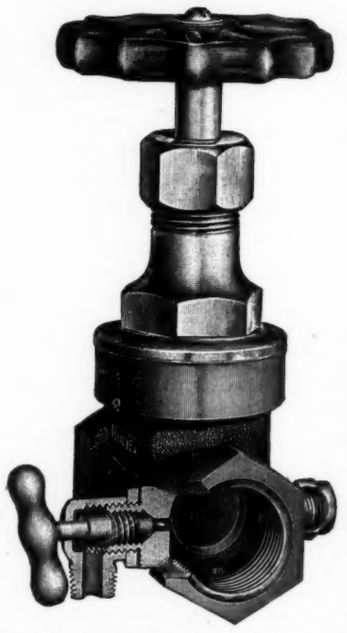


NATIONAL TRANSIT TRIPLEX WATER WORKS POWER PUMP.

POWER PUMPS.

Vertical Triplex Single Acting Type for Water Supply.

The National Transit vertical single acting power pumps have recently received a number of improvements. The step-chest type has a suction and discharge valve deck for each fluid chamber and so arranged that easy access to the valves is afforded. The valve areas and water passages are unusually large. The reduction of parts to a minimum



UNITED DRAINABLE GATE VALVE.

makes this design a desirable general service unit where economical and continuous operation is of first importance. The pumps are sturdily built, with simple construction and design. National Transit gas or oil engines are made for direct or belt connection to these pumps.

The accompanying illustration shows a pump of the step-chest type built for working pressures up to 100 pounds. The design is extra heavy with large bearings. The pumps are fitted with single reduction of gears with tight and loose pulleys, but may also be had with double reduction of gears and motor base or with friction clutch on pinion shaft. The capacities of the various sizes range from 52.1 to 312 gallons per minute, the one shown in the cut having a capacity of 175 gallons.

The main frame consisting of two uprights is cast integral with the fluid cylinders and crosshead guides in close grained iron, insuring rigidity and alignment. The main bearings for both the crankshaft and pinion shaft are of ample proportions to prevent undue wear or heating and are carefully babbitted and scraped. The crankshaft is cast steel and of ample proportions to easily withstand the maximum stresses. The main gear and the pinion are accurately "hobbed" from blanks of best quality charcoal iron. A substantial cast iron

guard covers the intermesh of the gears and sheet steel guard covers the entire main gear.

The connecting rods are of the marine type, having a babbitted box in each end, with the exception of those on the four smaller pumps which are fitted with a bronze bushing in the crosshead end. The crossheads are of the cylindrical type and, with the exception of the smaller sizes, have an adjustable shoe on the thrust side. The crosshead guides are cast integral with the main frame and are bored simultaneously with the fluid cylinders, thus assuring absolute alignment.

The fluid cylinders being cast integral with the main frame are made exceptionally heavy for the working pressure specified in order to withstand any undue shocks. The plungers are cast in extra hard close grained iron; they are turned true, polished and ground to size. The stuffing boxes are of ample depth to insure tight packing without undue tension on the glands and studs. The valve chest is of the step type and is cast separate, having a suction and discharge valve deck for each fluid cylinder, easily accessible by removing the valve chest covers. The fluid valves are of brass or rubber. The seats are of brass, forced into the valve decks on a taper. Guards and springs are brass.

These pumps are made by the National Transit Pump & Machine Company, Oil City, Pa., which makes a complete line for waterworks of all types of steam and power pumps, pumping engines and units, gas and oil engines, condensing machinery, gas and air compressors and Diesel engines.

INDUSTRIAL NEWS

Cast Iron Pipe.—Chicago—The leading interest is the low bidder for 300 tons at Garrison, N. D., and has also taken a contract for 1,000 tons of gas pipe. New inquiries for municipal pipe include 300 tons for Lincoln, Neb., 400 tons for Glen View, Ill., and 150 tons each for Riverton, Wyo., and Marshalltown, Ia. Quotations: 4-inch, $33.59 to $34; 6-inch and larger, $30.50 to $31; class A, $1 extra. Birmingham—Operations differ in the larger shops. Conditions are still somewhat slack, but there is a disposition to shade prices. Quotations: 4-inch, $28; 6-inch and up, $25; 16-foot lengths, $1 extra. San Francisco—Municipal business is coming out more freely and quite a tonnage is being booked in small orders from corporations. The town of Whittier, Cal., has just taken bids for about a mile of 12-inch pipe. Pasadena has ordered a lot of 24-inch; Los Angeles, 1,050 tons of 4 and 6-inch, and Othello, Ore., is figuring on a lot of 6-inch. Tacoma, Wash., is considering a project requiring a long pipe line and a lot of new mains. New York—No public lettings of much importance are announced, but private buying continues at a satisfactory pace. Quotations: Class B and heavier, $30.50; class A, $31.50.

Lead.—Lead has been fairly active, but prices are lower. Quotations: New York, 6.10 cents; St. Louis, 6.00.

United Brass Mfg. Co., Cleveland, O., has just issued a catalog, D-1, dealing expressly with waterworks. The new catalog has a number of unique features which should make it a welcome addition to the files of waterworks men. The tables of technical matter shown on the last few pages are especially selected because of their practical application to waterworks problems. One of the tables, an original one, gives the proportionate delivery of all pipes from ⅛-inch to 10-inch. The illustrations have their exact proportions to the actual goods indicated, as, for instance, all the pictures of corporation cocks show the ¾-inch size cock, and are reduced to three-fifths of the actual size. The different kinds of waterworks goods follow each other in the logical order of their use, beginning with corporation cocks and goose necks, and ending with meter couplings. This classification makes it very easy to find anything that is wanted. Following the waterworks goods there are a few pages showing plumbing goods which are frequently wanted by waterworks, such as stop and waste cocks and valves, hose and plain bibbs, sill cocks and hydrant cocks. The catalog is very neatly gotten up and the cover is particularly striking.

The Goodyear Tire & Rubber Co., Akron, O., has just issued the 1916 edition of "Facts of Interest for Fire Chiefs." It contains a complete list of cities using Goodyear tires of various types on city-owned trucks, cars and fire apparatus and an interesting list showing the number of machines using Goodyears with the gains made this year. On another page is a list of manufacturers using Goodyear tires on apparatus, also a tire load scale for pneumatics, fire truck tires and motor truck tires. The booklet states that the number of cities using Goodyear tires increased from 344 at the beginning of 1914 to 492 on Jan. 1, 1915, to 655 at the beginning of this year. At the same time the number of machines went up from 866 to 1,253 and to 1,632.

The Clydesdale Brick & Clay Co., Pittsburgh, Pa., with a new plant at Elwood, Pa., has become a licensee of the **Dunn Wire-Cut Lug Brick Co.,** Conneaut, Ohio. H. J. Orth is president of the Clydesdale company and W. W. Cunningham, vice-president and general manager. The Clydesdale plant at Elwood will have a daily capacity of 100,000 paving brick. It is the intention of the company to double the plant's capacity in the near future.

Dutiable Value of Sewer Pipe.—A memorandum issued by the Canadian Department of Customs specifies the discounts from list prices of sewer pipe and flue lining imported into Canada from the United States which will be deducted in order to ascertain the fair market value upon which duty is leviable. Information regarding discounts on the various classes of these articles may be obtained upon application to the Bureau of Foreign and Domestic Commerce, Washington, D. C. Articles imported into Canada are liable to antidumping duty when the invoice price is less than the fair market price to a similar class of purchasers in the country of exportation, except where the difference does not exceed 5 per cent.

The Seagrave Company, Columbus, O., has appointed to its sales organization J. W. Mackay, formerly sales engineer for the Star Electric Company.

NEWS OF THE SOCIETIES

(*Continued from page* 171.)

Municipal League, the City Managers' Association, the Civic Secretaries Conference, Bureau of Municipal Research workers and the New York Training School for Public Service will meet in Springfield during the week of November 20 to 25, constituting the largest gathering the interests of higher municipal standards held anywhere in the country.

The following organizations are already scheduled: National Municipal League, November 23-25; City Managers' Association, November 21-23; Civic Secretaries' Conference, November 23-24; Conference on Municipal Research, November 22-24; New York Training School for Public Service and Massachusetts Federation of Planning Boards. Those already invited include the Western New England Chamber of Commerce, Massachusetts Civic League, New England Association of Commercial Secretaries and the National Short Ballot Organization.

The organizations to be invited include: Massachusetts Mayors Club, Massachusetts Assessors Association, Massachusetts Tax Collectors Association, Massachusetts Association of Boards of Health, Massachusetts State Firemen's Association, Massachusetts Single Tax League, National Tax Association, National Association of Commercial Organization Secretaries, American Statistical Association, National Housing Association, League of American Municipalities, American Public Health Association, American School Hygiene Association, Playground and Recreation Society of America; International Association for the Prevention of Smoke, The School Garden Association of America, Society of Street Cleaning and Refuse Disposal of U. S. & Canada, International Association of Fire Engineers, New England Water Works Association, International Association of Municipal Electricians, International Association of Chiefs of Police, American Association of Park Superintendents, American Road Builders Association, National Conference on Concrete Road Building, Association of American Portland Cement Manufacturers, American Road Congress, National Paving Brick Manufacturers Association, Utilities Bureau.

American Electric Railway Association.

The thirty-fifth annual convention of the American Electric Railway Association and its affiliated associations, the American Electric Railway Accountants' Association, the American Electric Railway Engineering Association, the American Electric Railway Claims' Association, and the American Electric Railway Transportation and Traffic Association, will be held at Atlantic City, October 9 to 13, 1916.

New York Section, National Electric Light Association.

The New York section of the National Electric Light Association, made up of nine lighting companies in the metropolitan district, held its annual convention in the New York Edison Company's auditorium at 15th street and Irving place, July 17. Officers elected were: Chairman, Walter Neumuller, of the New York Edison Company; vice-chairman, Edward B. Fielis, of the New York and Queens Electric Light and Power Company; treasurer, G. B. Cornell, of the Yonkers Electric Light and Power Company; executive secretary, J. F. Delehant, of the New York Edison Company, and recording secretary, S. H. Giellerup, of the United Electric Light and Power Company.

Conference of Ohio Health Officers.

Health authorjties from numerous rural communities attended the forty-fourth conference of the Ohio board of health with representatives of local boards, which met at Cedar Point, Aug. 3 and 4. Dr. Angus MacIvor, president of the state health board, presided over the conference sessions.

Others on the program for the opening session of the conference, with their subjects, included: L. A. Boulay, county sanitary engineer, Toledo, "The Work of the County Sanitary Engineer"; Dr. Frances M. Hollingshead, director of the division of child hygiene, state department of health, "The Necessity of Child Welfare Work in Rural Communities," and J. S. McCune, chemist, division of laboratories, state department of health, "The Protection of Food Supplies."

The program for the evening session included addresses on "Sanitary Milk, from the Standpoint of the Producer," by Harry S. Melosh, chief inspector of the dairy bureau, Ohio department of agriculture; another on "Rural Sanitation," by R. S. Durrell, assistant engineer of the state health department, and an illustrated lecture on communicable diseases by Dr. Frank G. Boudreau, of the state health department.

The final session was held Friday forenoon when Dr. Boudreau discussed "The Importance of Preventing Measles and Whooping Cough."

New York State Association of Chiefs of Police.

At the convention of the New York State Association of Chiefs of Police, which was held in Kingston, July 27 and 28, Chief of Police Fred Brown of Newburgh advocated that the state civil service rules should be amended to take in cities of the third class. He said that under the present law a city of the third class could remove its police chief for political or other reasons and the removed chief could not apply to the state civil service for reinstatement. By placing the third class cities in the same class under civil service as cities of the first and second class, a police chief would be protected in his position. Considerable discussion followed the suggestion. No action was taken. Chief Samuel D. Gibson of Watervliet advocated that each chief in the association take up the question of a pension fund for the police in cities of the third class in the state with his assemblyman and senator and urge that an act of legislature create such a provision. His suggestion came in for general discussion and it was brought out that there were cities of the third class which already had pension funds, and it seemed to be the general expression of opinion that it was up to each individual city to see that such provision was enacted, and not take it up as a state-wide issue.

Formation of a state constabulary, free from politics was advocated by Edward J. Singleton, of Watertown, president, who also advocated installation of the Bertillion fingerprint and flashlight photograph system in every police department as a deterrent to crime. The following standard street traffic code was considered by the convention:

Prohibiting use of muffler cutout.

Prohibiting excessive emission of smoke or gases.

Prohibiting excessive use of warning signals.

Providing that all vehicles shall carry lights from one hour after sunset to one hour before sunrise.

Approval of the near-side stop regulation for street cars.

Providing car stop safety zones for persons getting on or off street cars.

Providing for protecting the car safety zones for encroachment by vehicles, either moving or standing.

Requiring that all vehicles must come to a full stop at least five feet behind a street car when stopping, or which has stopped, to receive or discharge passengers.

Requiring pedestrians to cross the street at the regular crossing, to cross with the traffic and comply with the signals of traffic officers.

Requiring the locking of unattended motor vehicles to prevent their removal by unauthorized persons.

Before an adjournment a resolution offered by Chief Blizard of Oneonta, that the convention go on record as favoring the establishment of a state constabulary to work with the police departments in the state was adopted.

The following officers were re-elected: President, Edward J. Singleton, of Watertown; vice-president, John T. Manion, of Herkimer; secretary and treasurer, James L. Hyatt, of Albany; sergeant-at-arms, G. O. Bush, of Tuxedo. James J. Long was selected a member of the board of governors in place of C. F. Evans for a term of three years. Chief McCabe, of Poughkeepsie, was named on the credentials committee. Included on the law committee are Chief John D. McCoach, of Middletown; Chief Fred W. Packard, of Amsterdam, and J. Allen Wood, of Kingston.

Schenectady was selected as the convention city in 1917.

BOOK REVIEWS

(*Continued from page* 170.)

sign and construction. In this the authors succeeded well, as the demand for the book shows. But since the publication of the first edition, about four years ago, much progress has been made in road design and construction and to meet this advance the book was revised by bringing up to date the material on top-courses and by adding considerable data on design, tests, costs, construction and maintenance, while revising much of the old material. About 100 pages in all were added. The book is divided generally into two parts: Principles of Design and Practice of Design and Construction. Under the first heading there are chapters on grades and alignment, sections, drainage, foundations, top courses and their maintenance and materials. The second part, taking up design and construction, covers the survey, office practice, cost data and estimates, construction notes and specifications. In the appendix are given the traffic rules and regulations for Ohio and traffic regulations for the state of New York. There are many handy tables which are used largely by road engineers.

PROCEEDINGS OF THE SECOND NATIONAL CONFERENCE OF CONCRETE ROAD BUILDING. Published by the Conference. 326 pages. Price $1.

This very complete book on concrete roads contains the proceedings of the National Conference on Concrete Road Building, held at Chicago, February 15-18, a list of the officers of the conference and a short and concise summary of the convention. Following this is the practice in concrete road construction recommended by the conference as to materials, drainage, forms, section, joints, mixing and placing and protection. There is a list of valuable and interesting papers and addresses on concrete road construction and finance, followed by reports of committees on subgrade preparation; economical widths of pavements and shoulders; thickness, crown and grade; aggregates; handling and hauling materials; crew organization; proportions and consistency of concrete; mixing and placing; reinforcement; joints; expansion and contraction; finishing and curing, maintenance, etc. The proposed standard specifications for one and two-course concrete road, street and alley pavements are given. The book is 6 x 9 inches and is neatly printed. It is bound with heavy paper.

ADVANCE CONTRACT NEWS

ADVANCE INFORMATION BIDS ASKED FOR

CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
			STREETS AND ROADS.	
Kans.,	Olathe	Aug. 12	Constructing roads	W. J. Moore, Co. Clk.
Col.,	Denver	11 a.m., Aug. 12	Concrete sidewalks in parks	W. F. R. Mills, Mgr., Improvements and Parks.
Del.,	Georgetown	1 p.m., Aug. 12	Constructing Dupont Rd.	Charles Upham, Chief Engr.
Ill.,	Salem	7 p.m., Aug. 12	Road construction; cost, $39,000	H. C. Morrison, Engr., Princeton, Ind.
W. Va.,	Moundsville	Aug. 14	Paving Elm Ave	City Clerk.
Minn.,	St. Paul	10.30 a.m., Aug. 14	Grading and improving streets	H. W. Austin, Pur. Agent.
N. Y.,	New Brighton	Noon, Aug. 14	20,500 sq. yds. bituminous macadam, 400 cu. yds. concrete header and 9,600 cu. yds. excavation, 900 ft. 12-inch pipe culvert	Engineer, Bur. of Engineering.
Ill.,	Chicago Heights	8 p.m., Aug. 14	Paving with asphaltic concrete	O. W. Ritter, City Clerk.
Pa.,	Ebensburg	1 p.m., Aug. 14	Applying bituminous material to road	H. T. Jones, Co. Controller.
Mich.,	Bay City	9 a.m., Aug. 14	Constructing pavement on several streets	F. P. S. Kelton, Chairman Bd. Pub. Wks
La.,	New Orleans	Aug. 14	Surfacing 10 miles of highway	W. E. Atkinson, State Highway Engineer.
Ind.,	Kokomo	Aug. 14	Laying concrete sidewalks	Bd. Pub. Wks.
N. J.,	Morristown	11 a.m., Aug. 14	Constructing two roads	Board Freeholders
N. Y.,	Albany	1 p.m., Aug. 14	Constructing state highways	Edwin Duffey, State Highway Commissioner.
Ala.,	Birmingham	noon, Aug. 14	Constructing 14 miles of highway	Geo. H. Clark, Co. Engr.
Ala.,	Camden	Aug. 14	Sand-clay or clay-gravel road	Blair Hughes, Co. Rd. Supvr.
Ind.,	Indianapolis	10 a.m., Aug. 14	Paving several streets	City Engineer.
Wis.,	West Allis	Aug. 14	6,478 sq. yds. reinforced concrete (with curb) and 6,576 sq. yds. concrete pavement; 7,700 cu. yds. of grading	E. G. Orbert, City Engineer.
Mass.,	Boston	noon, Aug. 14	Granite and wood block on several streets, cost $600,000	Edw. F. Murphy, Comr. P. W.
Ill.,	Peoria	Aug. 14	6,750 sq. yds. brick pavement, 4,800 ft. sandstone curb, catch basins, etc.; cost, $14,400	L. D. Jeffries, City Engineer.
Cal.,	San Diego	10 a.m., Aug. 14	Improving and paving streets	A. H. Wright, City Clerk.
Mich.,	Niles	noon, Aug. 14	3,600 ft. gravel paving	D. Weatherbee, City Clerk.
Mich.,	Coleman	Aug. 14	Grading, curbing and graveling	R. W. Roberts, Engineer, 114 Washington St., Saginaw, Mich.
Mich.,	Wyandotte	Aug. 15	Paving several streets	Charles Block, City Clerk.
Pa.,	Yeadon	6 p.m., Aug. 15	Furnishing and setting curbs	T. H. Lawn, Boro Secy.
Cal.,	Sacramento	11 a.m., Aug. 15	Grading and paving with asphaltic concrete	M. J. Desmond, City Clerk.
Ill.,	Berwyn	Aug. 15	Asphaltic concrete paving and concrete curb	B. Strutzenburg, City Engr.
Wis.,	Sheboygan	Aug. 15	Concrete paving, curbs and gutters	C. U. Boley, City Engineer.
N. Y.,	Seneca Falls	Aug. 16	Paving East Fall St.	S. S. Smith, Village Engineer.
Ky.,	Covington	10 a.m., Aug. 15	Grading and surfacing eight miles of road	J. B. Dillon, County Clerk.
Ala.,	Bay Minette	Aug. 15	Constructing section of Delta highway	J. M. Garrett, Co. Engineer.
Ohio,	Lebanon	Aug. 15	Five miles macadam road	Roy Miller, Engr., Courthouse.
Ind.,	Fort Wayne	10 a.m., Aug. 15	Grading bridge approaches; repairing bridges and culverts	Will Johnson, Co. Aud.
O.,	Columbus	noon, Aug. 15	Paving several streets and constructing sidewalks	G. A. Borden, Dir. Pub. Serv.
N. J.,	Trenton	10 a.m., Aug. 15	8,500 tons broken trap rock	E. A. Stevens, Comr. of Pub. Wks.
Ill.,	Marion	10 a.m., Aug. 15	Three miles concrete road	P. B. Wilson, Co. Hwy. Supt.
Ill.,	Alton	10 a.m., Aug. 15	Roads and sidewalks at State Hospital	F. D. Whipp, Fiscal Supvr., Springfield
O.,	Salem	noon, Aug. 15	8,500 sq. yds. brick pavement, 9,000 ft. stone curb, excavation and 8,000 ft. 4-in. tile drains	I. N. Russell, Dir. Pub. Service.
N. Y.	Auburn	Aug. 15	Paving several streets	T. B. Bergan, City Engr.
Pa.,	Embreeville	Aug. 15	8,500 ft. slag or macadam road	J. E. Young, Sec. Bd. Supvrs.
N. Y.,	Rensselaer	Aug. 15	Paving several streets with brick	L. Greenalch, City Engr.
Conn.,	Greenwich	5.30 p.m., Aug. 15	8,000 sq. yds. reinforced concrete pavement	Highway Commission
N. C.,	Albermarle	Aug. 15	25,000 to 50,000 sq. yds. pavement, curbs, storm sewers, etc.	Anderson & Christie, Engrs., Charlotte, N. C.
Pa.,	Beaver	10 a.m., Aug. 15	Grading and filling roads	County Commissioners.
Cal.,	Vallejo	Aug. 15	Improving several streets	T. D. Kilkenny, City Engr.
N. J.,	Montclair	Aug. 15	Paving and curbing on Bellevue Ave	E. S. Closson, Town Engr.
Minn.,	Hastings	1.30 p.m., Aug. 15	2 miles grading and turnpiking and 7 bridges and culverts.	P. A. Hoffman, Co. Aud.
N. Y.,	New Brighton	Noon, Aug. 15	12,600 sq yds. concrete pavement and 4,750 cu. yds. excavation, 1,500 ft. underdrain, guard rails, etc.	Engineer, Bur. of Engineering.
O.	Piqua	Noon, Aug. 15	Tarvia or other application on 700 sq. yds. macadam	L. E. Chamberlin, Dir. P. Ser.
Pa.,	Pittsburgh	10 a.m., Aug. 15	75,000 to 100,000 gals. light asphalt road oil; 40,000 to 50,000 gals. emulsifying road oil	County Road Commissioner, Court House.
N. Y.,	New York	2 p.m., Aug. 16	600 tons refined asphalt, 2,000 cu. yds. binder stone, paving with wood block, asphalt and granite block	Comr. of Public Works, Bureau of Highways.
O.,	Cleveland	Noon, Aug. 16	Paving Clark avenue viaduct	Commissioner of Engineering.
O.,	Cleveland	Noon, Aug. 16	Grading and improving Boulevard	Park Engineer, City Hall.
N. J.,	Passaic	2 p.m., Aug. 16	Paving with granite, macadam and bituminous concrete	Co. Engr., Paterson.
N. Y.,	Albany	1 p.m., Aug. 16	Constructing state highways	Edwin Duffey, State Highway Commissioner.
Ala.,	Bay Minette	Aug. 16	Constructing portion of Delta highway	J. M. Garrett, Co. Engineer.
Ind.,	Indianapolis	10 a.m., Aug. 16	Grading and paving streets	Board of Public Works.
N. Y.,	Schenectady	2.30 p.m., Aug. 16	13,200 sq. yds. stone filled asphalt pavement	Board of Contract and Supply.
N. J.,	Bloomfield	2 p.m., Aug. 16	15,170 sq. yds. macadam pavement	County Engr., Paterson, N. J.
O.,	Middletown	noon, Aug. 17	Cement sidewalk; curb and gutter and alley pavements; grading.	City Engineer,

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQ'S
O.,	Springfield	Aug. 17.	Paving several streets	C. E. Ashburner, City Mgr.
Pa.,	Plains	8 p.m., Aug. 17.	Curbing and paving with brick and granite	Parsons and Morgan, Engrs., 2d Nat. Bank Bldg., Wilkes-Barre, Pa.
Pa.,	Brentwood	8 p.m., Aug. 17.	15,000 ft. concrete curb and gutter, 90,000 sq. ft. concrete walk and 10,000 cu. yds. of grading	Douglass & McKnight, Engrs., Union Bank Bldg., Pittsburgh, Pa.
Ind.,	Crown Point	1 p.m., Aug. 17.	Constructing gravel road	Edw. Simon, County Aud.
O.,	Columbus	2 p.m., Aug. 17.	Brick and other paving on state roads	Clinton Cowen, St. Hwy. Comr.
Minn.,	Grand Rapids	10 a.m., Aug. 17.	Constructing county road	Frank Sherman, Co. Aud.
Ky.,	Paducah	10 a.m., Aug. 17.	Concrete and creosoted wood block pavement and concrete walk and gutters and granite curb	L. A. Washington, Comr. of Pub. Works.
Ia.,	Dubuque	8 p.m., Aug. 17.	Paving and curbing three streets	City Engineer.
N. J.,	Elizabeth	2:30 p.m., Aug. 17.	20,620 sq. yds. reclipped or napped stone block on concrete, 7,700 ft. bluestone curb, etc.	W. P. Neafsey, Street Comr.
Cal.,	Sacramento	11 a.m., Aug. 17.	Grading and paving with asphaltic concrete	M. J. Desmond, City Clerk.
N. Y.,	Long Island City	11 a.m., Aug. 17.	Paving with sheet asphalt and granite block on several streets	M. E. Connolly, Boro Pres.
Kan.,	Chanute	noon. Aug. 18.	Paving several streets	C. W. Pratt, City Engineer.
Mass.,	Boston	Noon, Aug. 18.	Paving with wood or asphaltic materials	E. F. Murphy, Comr. of P. W.
Minn.,	Winona	2 p.m., Aug. 18.	Grading and turnpiking; 1,450 ft. iron culverts, 12 to 26-in.	C. W. Anding, County Auditor.
O.,	Cincinnati	noon, Aug. 18.	Improving road in Colerain Twp	Albert Reinhardt, Clerk, Co. Comrs.
Pa.,	Butler	Aug. 18.	32,000 sq. yds. brick pavement, excavation, etc	J. N. Maharg, Ch. Co. Comrs.
Ind.,	Indianapolis	10 a.m., Aug. 18.	Grading and paving Pleasant street	Board of Public Works.
N. Y.,	Albany	1 p.m., Aug. 18.	Constructing state highways	Edwin Duffey, State Highway Commissioner.
Ind.,	Muncie	10 a.m., Aug. 19.	Constructing stone road	F. M. Williams, Co. Aud.
Ill.,	Catlin	2 p.m., Aug. 19.	9,000 sq. yds. brick pavements	W. H. Jones, Town Clerk.
Ind.,	Terre Haute	11 a.m., Aug. 19.	Constructing gravel road	Thos. Ferguson, Co. Aud.
Utah,	Salt Lake City	Aug. 20.	Concrete roads; cost, $38,000	S. Q. Cannon, City Engineer.
Ind.,	Kokomo	Aug. 21.	Improving Locke Street	Board of Public Works.
O.,	Dayton	noon, Aug. 21.	3,600 c. yds. road grading	W. H. Aszling, Clk., Co. Comrs.
Ind.,	Columbus	Aug. 21.	Paving four streets	G. Rader, City Engineer.
Ia.,	Denison	8 p.m., Aug. 21.	10,000 sq. yds. 7-in. concrete pavement and 5,174 feet concrete curb	Frank Woolston, City Engr.
Ala.,	Center	Aug. 21.	Constructing roads; furnishing drain tile	J. L. Savage, Probate Judge.
Wash.,	Colfax	Aug. 21.	Grading and gravelling 11 miles of road	J. M. McCaw, Co. Engr.
Cal.,	Los Angeles	Aug. 21.	Bitulithic pavement, concrete curb and walks, asphalt pavement, etc.	Homer Hamlin, City Engr.
Me.,	Portland	noon, Aug. 21.	Laying 3,200 sq. yds. redressed granite pavements	E. M. Hunt, Comr. Pub. Wks.
N. Y.,	Niagara Falls	Aug. 22.	Paving Lewiston hill	O. E. Carr, City Manager.
Wash.,	South Bend	10 a.m., Aug. 22.	Grading, draining and surfacing one mile	C. B. Nims, Co. Engineer.
O.,	Oxford	noon, Aug. 22.	Brick or asphaltic pavement	L. A. Boulay Co., Nicholas Bldg., Toledo, O., Engrs.
Cal.,	Sacramento	11 a.m., Aug. 22.	Paving with asphaltic concrete	M. J. Desmond, City Clerk.
Ind.,	South Bend	10 a.m., Aug. 22.	Constructing sidewalks and curbs	Board of Public Works.
N. J.,	Asbury Park	10 a.m., Aug. 22.	Concrete or stone sidewalk and curbs	H. B. White, City Clerk.
Ohio,	Akron	Aug. 25.	Improving street	J. A. Gehres, City Engr.
O.,	London	noon, Aug. 25.	First-class pavement on Main St	J. W. Byers, Village Clerk
Tex.,	Clarksville	Aug. 25.	Paving with concrete and constructing curb and gutter, cost $90,000	J. R. Johnson, Engineer
Ala.,	Center	Aug. 26.	Constructing roads	J. L. Savage, Probate Judge.
Ala.,	LaFayette	Aug. 28.	Two miles of road	F. E. Fitch, County Engr.
Ill.,	Knoxville	6 p.m., Aug. 28.	10,000 sq. feet cement walk	Charles Hoffman, Chairman Streets & Walks Comm.
Md.,	Baltimore	Noon, Aug. 29.	8.45 miles concrete, macadam or bituminous macadam state highway	State Roads Commissioner.
O.,	Columbus	Noon, Sept. 1.	Grading and constructing bridge approaches at Big Run bridge	John Scott, Clerk, Co. Comrs.
Ind.,	Indianapolis	10 a.m., Sept. 1.	Curbing and paving streets and alleys	B. J. T. Jeup, City Engineer.
Ariz.,	Globe	Sept. 1.	64,000 sq. yds. concrete pavement	R. G. Thomas, County Engr.
Ind.,	Fort Wayne	10 a.m., Sept. 1.	Constructing macadam roads	Will Johnson, Co. Aud.
O.,	Columbus	noon, Sept. 2.	Levee work, requiring 2,000 cu. yds. excavation and 650 sq. yds. macadam road	John Scott, Clerk, Co. Comrs.
Ind.,	Bloomington	Sept. 4.	Constructing county road	County Auditor.
Pa.,	Hughesville	noon, Sept. 4.	5,000 sq. yds. permanent pavement	W. C. Fulmer, Boro Secy.
Ind.,	Angola	1 p.m., Sept. 5.	One mile cement and one-half mile gravel roads	F. C. Dewey, Co. Auditor
N. J.,	Mt. Holly	11.30 a.m., Sept. 6.	16,800 sq. yds. macadam pavement	James Logan, Co. Engr.
Ind.,	Indianapolis	10 a.m., Sept. 8.	Paving and improving streets and alleys	B. J. T. Jeup, City Engineer.
Ala.,	Birmingham	noon, Sept. 11.	Constructing Warrior River road	G. H. Clark, County Engr.
Ariz.,	Phoenix	Sept. 20.	12,200 sq. yds. pavement	J. B. Girard, City Engineer.

SEWERAGE.

Okla.,	Fairfax	Aug. 12.	Constructing sewer system	Board of Trustees
Pa.,	Bethlehem	noon, Aug. 12.	1,700 ft. 42 and 48-in. sewers	A. M. Cawley, Boro Engr.
N. J.,	Hoboken	Aug. 12.	Sewer construction, cost $9,000	City Commissioners
Ohio,	New Bremen	Aug. 12.	Constructing storm water sewer	H. A. Schrage, Clk.
Neb.,	Plattsmouth	5 p.m., Aug. 14.	475 ft. 54-in. storm sewer	J. F. Warga, City Clerk.
O.,	Masillon	noon, Aug. 14.	4,050 ft. sewer construction	County Surveyor.
O.,	Canton	Aug. 14.	Furnishing and laying 4,000 ft. vit. sewers	W. C. Schick, Clerk Co. Comr.
O.,	Toledo	noon, Aug. 14.	Nine miles 6 to 27-in. vit. sewers, 7 miles 6-in. c.-i. pipe, specials, flush tanks, manholes, etc	Gabe Cooper, Co. Auditor
Conn.,	Stamford	8 p.m., Aug. 14.	8,000 ft. of storm sewers	Paul Nash, City Engr.
Ia.,	Oelwein	8 p.m., Aug. 14.	7,500 ft. 6 to 15-in. sewer construction	G. H. Bishop, City Engineer.
Ont.,	New Toronto	Noon, Aug. 14.	Sanitary sewers and pumping plant	T. Lowes, Engineer.
Ill.,	Peoria	Aug. 14.	Constructing sewers and catch basins	L. D. Jeffries, City Engineer.
N. Y.,	Ballston Spa	Aug. 15.	Cleaning four sewer beds	Village Trustees.
Cal.,	Sacramento	11 a.m., Aug. 15.	Sewers and drains in connection with road work	M. J. Desmond, City Clerk.
Ind.,	New Point	Aug. 15.	Constructing storm sewer	Village Clerk.
Ia.,	New Hampton	Aug. 15.	Disposal plant to cost $20,000	F. B. Strike, City Clerk
N. J.,	Rahway	11 a.m., Aug. 15.	805 ft. 12-in. tile sewer	Merck & Co.
Ill.,	Granite City	2 p.m., Aug. 15.	Outlet sewer, 3 ft. to 9 ft.; cost $350,000	Edmond Hall, Engineer, Kistner Bldg.
Minn.,	St. James	Aug. 15.	Tile drainage ditches; cost, $80,000	E. E. Nichols, City Engineer.
Ga.,	Savannah	noon, Aug. 15.	One mile 66x84-in. to 120x78-in. concr. box sewers	E. R. Conant, Chief Engineer.
O.,	Ravenna	Aug. 15.	Constructing sanitary sewers, cost $9,000	W. H. Linton, Engr.
Cal.,	Chino	8 p.m., Aug. 15.	Constr. sewer system; cost, $55,000	City Clerk.
O.,	Columbus	noon, Aug. 15.	Constructing sewers, etc.; automatic electric pump	A. Borden, Dir. Pub. Serv.
N. J.,	Hoboken	10 a.m., Aug. 16.	Sewers in several streets	D. A. Haggerty, City Clerk
N. Y.,	Schenectady	2.30 p.m., Aug. 16.	500 ft. c. i. and 2,000 ft. tile sewers	Bd. of Contract and Supply.
O.,	Salem	noon, Aug. 16.	604 ft. 8-in. sewer and 8,000 ft. 4-in. tile drains	I. N. Russell, Dir. Pub. Service.
O.,	Struthers	noon, Aug. 16.	Constructing storm and sanitary sewers	Jonah Richards, Village Clerk.
N. Y.,	Long Island C.	11 a.m., Aug. 16.	Large concrete and pipe sewers in several streets	M. E. Connolly, Boro. Pres't.
N. Y.,	New Brighton	Noon, Aug. 16.	1,270 ft. 8-in. sewer and 114 spurs	Engineer, Bur. of Engineering.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Mass.,	Boston	Noon, Aug. 16.	Constructing overflow extensions, South Boston	E. F. Murphy, Comr. of P. W.
Pa.,	Plains	8 p.m., Aug. 17.	Constructing storm sewer	Parsons and Morgan, Engrs., 2d Nat. Bank Bldg., Wilkes-Barre, Pa.
Ind.,	Evansville	9 a.m., Aug. 17.	750 ft. 12-in. sewer	Board of Public Works.
O.,	Springfield	noon, Aug. 17.	Constructing storm water sewer	C. E. Ashburner, City Man.
Cal.,	Sacramento	11 a.m., Aug. 17.	Sewers and drains in connection with road work	M. J. Desmond, City Clerk.
Wis.,	Kaukauna	Aug. 18.	Sewers in 3 streets	City Clerk
Ont.,	London	9.30 a.m., Aug. 18.	22,500 feet storm sewers	H. A. Brazier, City Engr.
Ill.,	DuQuoin	Aug. 20.	5 miles 8 to 12-in. pipe sewers	J. C. Gibson, City Engineer.
Ia.,	Stuart	8 p.m., Aug. 21.	40,000 ft. 6 to 12-in. sewers, Imhoff disposal plant and filter and sludge bed	T. S. DeLay, Engineer, Creston.
O.,	Columbus	noon, Aug. 21.	Constructing sand catcher at sewage pumping station	Jerry O'Shaugnessy, Supt. Water & Sewage.
Minn.,	Marshall	9 a.m., Aug. 21.	Tile drainage ditches, cost $22,000	O. H. Sterk, Engineer.
N. Y.,	Fulton	Aug. 21.	5,000 ft. 15 to 60-in. sewers, cost $27,000	G. C. Hill, City Engr.
Pa.,	Bellwood	Aug. 21.	46,000 ft. 6 to 10-in. sewer, sprinkling filter and Imhoff tank; total cost about $42,000	Harvey Linton, Engr., 1717 13th St., Altoona, Pa.
N. J.,	Pitman	8 p.m., Aug. 21.	16 miles 6 to 15-in. vitrified sewers, 209 manholes, 30 flush tanks and two disposal plants	Remington & Vosbury, Market St., Camden, N. J.
Ind.,	Kokomo	Aug. 21.	Constructing 8-in. sewer	Board of Public Works.
Cal.,	Los Angeles	Aug. 21.	Storm and sanitary sewers	Homer Hamlin, City Engr.
N. J.,	Camden	8 p.m., Aug. 21.	Constructing sewer.	City Engineer.
Ind.,	Logansport	10 a.m., Aug. 22.	Constructing sanitary sewer	Board of Pub. Wks.
Cal.,	Sacramento	11 a.m., Aug. 22.	Sewers and drains in road construction	M. J. Desmond, City Clerk.
Minn.,	Kasson	8 p.m., Aug. 23.	Constructing three sewers	J. F. Druar, Engr., St. Paul.
Ia.,	Anthon	2 p.m., Aug. 24.	13,500 ft. 8 and 10-in sewer, septic tank, sludge bed and 2 filter beds	Town Clerk
Ohio,	Akron	Aug. 25.	Constructing vitrified tile sewers	E. A. Zeisloft, Engr.
Minn.,	Madison	8 p.m., Aug. 28.	7 miles 6 to 15-in. sanitary sewers, outlet sewer and disposal plant	L. P. Wolff, Engineer, Germania Life Bldg., St. Paul, Minn.
Ind.,	Fort Wayne	10 a.m., Aug. 29.	Furnishing drain tile	Will Johnson, Co. Auditor.
Ill.,	Chicago	noon, Aug. 31.	Constructing intersecting sewer	John McGillen, Clerk, Sanitary District of Chicago.
O.,	Conneaut	Sept. 1.	Sewers in several streets	S. W. Mahaffey, Dir. P. Serv.

WATER SUPPLY.

O.,	Medina	Aug. 12.	Filtration and pumping plants	F. L. Rollins, Supt. W. Wks.
D. C.,	Washington	Aug. 12.	Pumps, piping, etc.	Bureau of Yards and Docks, Navy Dept.
Ill.,	Palatine	6 p.m., Aug. 12.	Cast iron mains, pipes and hydrants	Board of Local Improvements.
Ill.,	Wyanet	Aug. 14.	Constructing water works system	J. R. Gray, Engineer. Old Colony Bldg., Chicago, Ill.
N. Y.,	Newburgh	Noon, Aug. 14.	Excavating and backfilling water main trench 103 ft. long	Henry Wilson, City Manager.
Cal.,	Los Angeles	2 p.m., Aug. 14.	Installing water system	H. J. Lelande, Co. Clerk.
Neb.,	Rogers	Aug. 14.	Pumping station, 20,000-gallon tank on tower, hydrants, valves and 4,150 ft. 4 and 6-in. c.-i. pipe	Fairbanks, Morse & Co., Omaha, Neb.
Quebec,	Drummondville	Aug. 15.	500,000-gallon gravity filter plant	W. A. Molson, Town Clerk
O.,	Rocky River	noon, Aug. 15.	Laying 8-in. water main	E. H. Arnold, Village Engr.
Minn.,	Spooner	Aug. 15.	Drilling 8-in. well, 1,000 ft. deep	A. M. Robertson, Village Clk.
Sask.,	Assiniboia	6 p.m., Aug. 15.	Water works and lighting plant	Murphy & Underwood, Engrs., Saskatoon, Sask.
Md.,	East New Market	noon, Aug. 15.	Laying 5,000 ft. 4 and 6-in. c.-i. mains, 13 hydrants, etc.	Kastenhuber & Anderson, Engrs., Easton, Md.
N. Y.,	Irvington	7.30 p.m., Aug. 15.	2,600 ft. 12-in. water main	Jos. Murphy, Clk. Water Bd.
O.,	Columbus	noon, Aug. 15.	Laying water service pipe (with street work)	G. A. Borden, Dir Pub. Serv.
Ohio,	Salem	Aug. 15.	Distribution system and reservoir; cost, $50,000	J. M. Russell, Dir. Pub. Serv.
Tex.,	Kenedy	Aug. 15.	Waterworks system, oil engine, triplex pump and steel tank and tower	R. E. Goode, Village Clerk.
Tenn.,	Johnson City	7:30 p.m., Aug. 15.	Two hundred twenty-five ⅝ to 2-in. meters	P. F. McDonald, Commissioner & Engineer.
Va.,	Richmond	Aug. 15.	C. i. pipe, 30-in. valves, lead and jute	E. E. Davis, Supt. of W. W.
Wis.,	Winnebago	Aug. 16.	Sprinkler system in Insane Hospital	State Bd. Control, Madison
O.,	Dover	noon, Aug. 16.	11,500 ft. 12 and 14-in. c.-i. main, pumps, and 1½ million-gallon standpipe	P. W. Hill, Dir. Pub. Service
Conn.,	Hartford	Aug. 16.	22,500 ft. 6 to 12-in. c. i. mains	W. G. Aubrey, Supt. of Water Board.
N. Y.,	New York	10.30 a.m., Aug. 16.	Furnishing pipe, valves, etc.	Robert Adamson, Fire Chief.
Wis.,	Colby	8 p.m., Aug. 17.	153,000-gal. concrete water tank	F. W. Lulloff, City Clerk
N. Y.,	New York	2 p.m., Aug. 17.	Furnishing and laying water mains	Corporation Counsel, Municipal Bldg.
O.,	Ravenna	noon, Aug. 18.	Constructing water works system	W. H. Linton, Dir. Pub. Serv.
D. C.,	Washington	Aug. 18.	Steel and cast-iron pipe and fittings	Gen. Pur. Officer, Pan. Canal
Ill.,	Glasford	3 p.m., Aug. 18.	Water works improvement, including material and construction of steel tower and tank, building and pumps.	Fuller-Coult Co., Engrs., Chemical Bldg., St. Louis, Mo.
O.,	Medina	noon, Aug. 19.	Mechanical filtration and pumping plant	F. L. Rollins, Supt. W. Wks.
Wyo.,	Lovell	8 p.m., Aug. 21.	10,900 ft. 6 and 10-in. c.-i. pipe; building intake and pump sump.	Daniel T. Cotner, Engr.
Wis.,	Clintonville	Aug. 25.	Laying water mains	Julius Spearbraker, Secy.
D. C.,	Washington	Aug. 26.	4-in. flexible joint, submerged pipe line at Naval Training Station, San Francisco	Bureau of Yards & Docks, Navy Dept.
Ill.,	Great Lakes	Aug. 26.	Two 500,000-gallon rapid sand filter plant	Bureau of Yards and Docks, Navy Dept., Wash., D. C.
Ia.,	Jewell	2 p.m., Aug. 28.	Constructing extension to water works system	L. W. Cox, Engr., 621 Grand Ave., Des Moines, Ia.
O.,	West Park	noon, Aug. 31.	Furnishing and laying water mains	Lander Engineering Company, American Trust Bldg., Cleveland, O.
N. Y.,	New York	11 a.m., Sept. 5.	Furnishing and installing controling mechanism for valves in Catskill aqueduct (city tunnel)	Principal Assistant Engineer, Board of Water Supply.
Del.,	Wilmington	10.30 a.m., Sept. 6.	Two 9,000,000-gallon and one 12,000,000-gallon steam turbine-driven centrifugal pumps	Edgar M. Hoopes, Jr., Chief Engr.

MISCELLANEOUS.

Tex.,	Donna	Aug. 14.	Improving and extending irrigation districts	Bd. of Directors, Donna Irrigation District.
N. J.,	East Orange	Aug. 14.	600 ft. steel and wire fence	L. E. Rowley, City Clerk.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Cal.,	Los Angeles	10 a.m., Aug. 14.	Sweeping streets with power sweeper	L. B. Ferris, Secy. Bd. Pub. Works.
Tenn.,	Nashville	Aug. 15.	Sale of old electric machinery	Board of City Commissioners.
Pa.,	Pittsburgh	10 a.m., Aug. 15.	Furnishing two transits	Co. Road. Comr., Court House.
O.,	Cleveland	Noon, Aug. 16.	Concrete swimming pool	Park Engineer, City Hall.
Mass.,	Boston	11.a.m., Aug. 16.	500 ft. concrete retaining wall with rip rap along Connecticut River	Board of Harbor & Land Commissioners.
Ind.,	Fort Wayne	10 a.m., Aug. 16.	2½-ton motor truck	Will Johnson, Co. Aud.
N. C.,	Fargo	10 a.m., Aug. 16.	Mechanical stokers and smoke-eliminating and fuel-saving devices at pumping station	A. R. Watkins, City Auditor.
Ind.,	Huntington	Noon, Aug. 17.	Cleaning and repairing drainage ditch	J. Hall, Trustee, Wayne Twp.
Ind.,	Kokomo	2 p.m., Aug. 17.	Cleaning and repairing drainage ditch	B. I. Donohue, Trustee, Clay Twp.
N. Y.,	New Rochelle	11 a.m., Aug. 18.	Constructing refuse destructor	J. A. Hadert, Comr. of Pub. Works.
Pa.,	Erie	Aug. 18.	Work on Mill creek improvement project	F. G. Lynch, City Engineer.
O.,	Columbus	noon, Aug. 21.	Gasoline locomotive at sewage treatment plant	Jerry O'Shaugnessy, Supt. Water & Sewage.
Pa.,	Reading	10 a.m., Aug. 23.	Disposing of garbage and sewage sludge	Charles Marks, City Clerk.
Man.,	Carberry	6 p.m., Aug. 25.	Two steel oil tanks (12,000 gals. each), 4 pumps, pipe, fittings, etc.	W. D. Card.
Ind.,	Brazil	noon, Aug. 25.	Constructing public drain	W. S. Rowley, Drainage Comr.
Ind.,	Brazil	noon, Aug. 25.	Constructing public drain	W. S. Rowley, Drainage Comr.
Minn.,	Foley	3 p.m., Aug. 30.	48,780 cu. yds. ditch excavation	J. E. Kasner, Co. Aud.
La.,	New Orleans	noon, Sept. 13.	Two 15-ton traveling cranes	Sewerage & Water Board.

STREETS AND ROADS

Phoenix, Ariz.—An ordinance has been passed providing for improvement of First St. from the north line of Adams St. to the south line of Van Buren St. and of Monroe St. from the east line of Central Ave. to the west line of Second St.

Los Angeles, Cal.—Ordinances have been passed providing imporvement of several streets.

Oak Park, Cal.—City Commission has ordered the paving of East Ave. from Cypress Ave. to Seventh Ave.

Sacramento, Cal.—Improvements have been ordered on several streets, consisting of paving, grading, installing of sewers, etc.

Placerville, Cal.—City Clerk has been instructed to advertise for bids for paving Main St.

Boulder, Colo.—County Commissioners are to improve Boulder Canon road through the Narrows.

Arcadia, Fla.—The city council has passed an ordinance calling for an election on Aug. 29 for the purpose of determining whether or not the city of Arcadia shall bond for the sum of $145,000 to be used as follows: For street improvement, $90,000; for sanitary sewer, $21,000; for extension of water works, $19,000; for site and a city hall, $15,000.

Avon, Fla.—Bonds will be issued for paving city streets.

Key West, Fla.—The county commissioners have decided to call for an election to bond the county for $125,000 to build roads on the Florida Keys. The roads will be on Pine Key, Key Largo, Cape Sabel and Stock Island. Biscayne Construction Co. have made a survey of the proposed route, and submitted the estimate of the cost as follows: Pine Key, $9,000; Key Largo, $46,000; Cape Sable, $66,000; and Stock Island, $5,000. The Stock Island road will connect with the present county road.

Miami, Fla.—Contracts will be let in Broward County for the building of 17 miles of new hard surface roads and contracts will be called for at an early date.

Perry, Fla.—Bonds amounting to $600,000 will be issued to use constructing system hard surfaced roads.

Atlanta, Ga.—It has been ordered that the public works committee be authorized to purchase asphalt binder for the paving of Mayson and Turner road from Elliott's store to Hightower road; Bolton road from Mayson's church to Marietta road; Virginia Ave. from Highland Ave. to North Blvd.; Tenth St. from Piedmont Ave. to North Blvd.

Atlanta, Ga.—Peachtree St. is in need of paving.

Boise City, Ida.—Municipal bonds amounting to $29,285.91 are to be issued, sealed bids will be received until noon, Aug. 29. Nancy E. Robertson, city clerk.

Champaign, Ill.—Estimated cost of paving State St. north of Maple St. and a portion of Bloomington road is more than $21,000.

Freeport, Ill.—Bonds amounting to $850,000 are to be issued for construction of the following roads: 5 7-8 miles 15-ft. brick, $94,177; 1¼ miles 10-ft. brick, $15,000; 2¼ miles 15-ft. concrete, $29,750; 1 5-8 miles 10-ft. concrete, $15,200; 1½ miles 15-ft. resurfacing, bitulithic macadam, $9,000; 3-4 mile 10-ft. resurfacing, bitulithic macadam, $2,820; 1¼ miles 15-ft. resurfacing macadam, $5,350; 3 3-4 miles 10-ft. resurfacing macadam, $10,875; 10 3-4 miles 15-ft. macadam, $97,450; 16 7-8 miles 10-ft. macadam, $117,000; 4¼ miles 15-ft. gravel, $31,400; 63½ miles 10-ft. gravel, $361,555; 46 1-24 miles oiled earth, $59,213; extra drainage, cuts and fills, $1,010; total, 159¼ miles, $850,000.

Angola, Ind.—Gravel road bonds amounting to $19,600 will be sold between 1 and 4 o'clock p. m. Aug. 8; also bonds amounting to $5,520.

Columbus, Ind.—Plans and specifications accepted by the county commissioners for a 6-mile stretch of concrete road leading southeast from this city, include an estimate of cost that more than uses up the surplus road fund in Columbus Twp. At the beginning of this year there was more than $300,000 in the township road fund, and contracts have been let for $204,000. The estimate on the new piece of road is $101,200.

Danville, Ind.—Breed, Elliott & Harrison, Indianapolis, have purchased road bonds amounting to $9,280.

Fort Wayne, Ind.—The council has passed an ordinance appropriating $7,500 to the street maintenance and repair account.

Indianapolis, Ind.—Breed, Elliott & Harrison have purchased three issues Howard county highway bonds, total, $46,400. State Bank of Monticello, Monticello, Ind., have purchased three issues of White county highway bonds, total $22,400. Dollings & Co. have purchased Marion county road bonds amounting to $6,400.

Indianapolis, Ind.—J. F. Wild & Co. have purchased Boone County highway bonds amounting to $19,000; Breed, Elliott & Harrison have purchased the $9,800 issue and First National Bank the $18,600 issue.

Kokomo, Ind.—Breed, Elliott & Harrison have purchased the following road bonds: Brown road, Center township, $63,000; Collins road, Union township, $5,800; Wilson road, Irvin township, $9,600; the Haynes drain, $17,199.

Lafayette, Ind.—Aug. 11, at 2 p. m., by treasurer of Tippecanoe county, for sale, $14,400 highway improvement bonds, 4½ per cent, ten years. Harry G. Leslie, treasurer.

Lawrenceburg, Ind.—Aug. 11, at 11 a. m., by treasurer of Dearborn county, for sale, $14,000 highway improvement bonds, 4½ per cent, 20 years. John A. Bobrink, treasurer.

North Vernon, Ind.—First National Bank has purchased bonds amounting to $9,660 for construction of the J. L. Ewan pike in Spencer Township.

North Vernon, Ind.—First National Bank have purchased road bonds amounting to $9,660.

Plymouth, Ind.—Plymouth State Bank have purchased bonds amounting to $59,750 for road improvement.

Scottsburg, Ind.—Aug. 15, at 10 a. m., by treasurer of Scott county, for sale, $18,200 highway improvement bonds, 4½ per cent, 10 years. Hugh Colvin, treasurer.

South Bend, Ind.—Aug. 16, at 10 a. m., by treasurer of St. Joseph county, for sale, $18,000 highway improvement bonds, 4½ per cent, 10 years. Fred W. Martin, treasurer.

Wabash, Ind.—Lafontaine Bank have purchased bonds amounting to $40,000 for improvement Dixie highway.

Winchester, Ind.—Contracts have been let for building 9 roads.

Ames, Ia.—Every mile of the road system in Buena Vista county is to be surfaced with gravel just as soon as possible. The contract has already been let for about 30 miles, which is to be completed this year.

Independence, Ia.—The City Council is considering the paving question for next year and in all probability about 21 blocks will be laid, asphaltic concrete seems to be the favored pavement, but the kind has not as yet been definitely selected.

Topeka, Kan.—Contained in the 1917 city budget are the following items: Fire department, $71,760.45; street department, $57,100; electric light department, $19,500.

Topeka, Kan.—The preliminary work of estimating the cost of the proposed brick highway to Dover and Auburn has begun. W. J. Arnold, county engineer, Harry Tidd, engineer for the Western Association of Brick Manufacturers, and a party of Topeka road boosters will go over the entire route.

Carlisle, Ky.—The Fiscal Court of Nicholas County today issued an order for the reconstruction of the Headquarters turnpike and the Lower Jackson turnpike.

Baton Rouge, La.—A petition asking the East Baton Rouge parish police jury to call a special election to decide upon the voting of a $130,000 bond issue for additional good roads in the Third Ward has been presented to the police jury. It is proposed to build 42 miles of graveled roads.

Landry Parish, La.—Sealed bids will be received until 2 o'clock Sept. 4 for purchase of road bonds amounting to $18,500.

Agawam, Mass.—A meeting has been held to act on a proposition to appropriate $13,000 for a stone road on Meadow St.

Beverly, Mass.—Water St. is to be paved with granite block.

Boston, Mass.—The following streets are to be paved, and estimated costs: Battery March from Franklin to Broad, $4,500; Beach, from Harrison to Atlantic Aves., $10,500; Canal, from Haymarket Sq. to Causeway St., $5,600; Clinton, from Merchants Row to Commercial St., $11,300; Cross, from Commercial St. to Haymarket Sq., $10,000; Devonshire, from Adams Sq. to Water St., $8,300; Fulton, from Blackstone to Richmond, $10,000; Harrison Ave., from Kneeland to Dover, $20,000; Haymarket Sq., $30,000; Lincoln, from Essex to Beach, $11,000; McKinley Sq., $21,000; Mercantile, from South Market to Richmond, $9,600; School, from Tremont to Washington, $5,400; Washington, from Haymarket Sq. to Elm St., $8,900; Albany St., from Kneeland to B. & A. R. R. bridge, $20,000; Albany, from Dover to Northampton, $124,000; Columbia Road,

from Edward Everett Sq. to Dudley St., $15,000; Dorchester Ave., from Savin Hill Sq. to Freeport St., $31,500.

Leominster, Mass.—It has been suggested that a new street be constructed from Main St. to Water St. to relieve congestion of traffic in Monument Sq.

Lowell, Mass.—Tewksbury voters want gas and a new boulevard on south side river.

Houghton, Mich.—Kearsage St. is to be graded and a new catch basin installed. Later the street will be macadamized.

Duluth, Minn.—Several streets are to be paved at a cost of about $500,000.

Keewatin, Minn.—Sealed bids will be received to 7.30 p. m., Aug. 16, for purchase of bonds amounting to $50,000.

Sanatobia, Miss.—A road is to be built from Sanatobia to Tyro, 17 miles east.

Joplin, Mo.—Main St. and West 3d may be paved from Broadway to viaduct.

Chillicothe, Mo.—Ann St. is to be graded, paved and curbed from Locust St. to Cherry St.

Kansas City, Mo.—On the protest of property owners on 19th St. from McGee St. to Troost Ave., the board of public works yesterday rescinded its action to pave the street with wood blocks and began a substitute proceeding to repair the pavement. Curtis Hill, city engineer, said the street repair department had advised him the pavement could not be repaired. The base of the pavement is macadam and rolls under the surface under heavy traffic.

Jackson, Miss.—R. M. Grant & Co., New York City, have purchased improvement bonds amounting to $800,000.

Blairstown, N. J.—State has granted $6,000 for roadway from Blairtown to vitrified brick of West Pomfret St. and the station of the Lackawanna Railroad. The railroad will contribute $5,000 and the township $1,000.

Burlington, N. J.—Several streets are to be improved.

Elizabeth, N. J.—All bids for the repaving of Elizabeth Ave., from Broad St. to 7th St., with reclipped block, have been rejected by the board of works. A resolution has been adopted directing Street Commissioner Neafsey to advertise for new proposals for the work.

Plainfield, N. J.—Main St. is to be paved with vitrified brick.

Auburn, N. Y.—See Sewerage.

Binghamton, N. Y.—The project contemplating the widening of Commercial Ave. at its intersection with Court St. by the purchase of the Salzman block, has come to life again and active steps are being taken to bring about the improvement. Cost would be $35,000.

Niagara Falls, N. Y.—The paving of the River road from the city line to Cayuga creek is under consideration.

Ravenna, N. Y.—An appropriation of $14,000 is called for to cover cost of widening Main St. to 25 feet the entire length of village with curbs and gutters.

Rochester, N. Y.—Estimates submitted by city engineer on the cost of proposed improvements as follows: Atlantic Ave. walks, $700; Ringle Pl. sewer, $2,750; University Ave. asphalt pavement, $11,500; Canal St. asphalt resurfacing, $10,000; Bellevue Drive asphalt pavement, $5,000; Marigold St. asphalt pavement, $3,650; Ohio St. sewer, walks and grading, $10,000; Minnesota St. sewer, walks and grading, $10,000; Hoster Park cement walks, $1,000; Augustine St. drainage ditch, $500; Hennakey Park sewer, walks and grading, $9,000; Riley Pl. asphalt pavement, $4,500; O'Neil St. asphalt pavement, $4,800; Inglewood Drive asphalt pavement, $43,000.

Seneca Falls, N. Y.—Requests for bids on the paving of East Fall St. from the new Ovid St. bridge east to the shore of the barge canal harbor will be asked for this week by the village board. Village Engineer Sidney S. Smith has completed all plans and specifications for the work.

Seneca Falls, N. Y.—The lower end of Fall St. is to be paved with brick, with concrete curbs.

Syracuse, N. Y.—More streets are to be paved.

Utica, N. Y.—City Council has authorized bond issue of $12,000 for resurfacing of streets.

Waterv[illegible]et, N. Y.—Several streets are to be repaved.

Beaufort, N. C.—See Miscellaneous.

North Wilkesboro, N. C.—It has been suggested that bonds be issued for repairing roads and bridges destroyed by floods.

In This Issue: Contract News

Roads and Streets.

83 new bids asked
117 proposed work items

Sewerage:

47 new bids asked
47 proposed work items

Water Supply:

25 new bids asked
62 proposed work items

428 advance news items, including "Miscellaneous"—all new and reliable, for the municipal works contractor. More municipal contract news than any other paper.

Municipal Journal Leads in Service to Contractors

A Correction.

The number of "Bids Asked" items under Roads and Streets in the last issue was incorrectly given as 35 in that issue. The correct number was 85, the misstatement being due to a typographical error.

Bowling Green, O.—The Ohio National Bank, Columbus, have purchased road bonds amounting to $120,000. The Wood County Savings Bank, local, have purchased road bonds amounting to $60,000.

Coshocton, O.—See "Water Supply."

Geneva, O.—Sealed proposals will be received at the office of the village clerk until noon, Aug. 21, for road repair bonds amounting to $4,500. W. E. Morgan, clerk.

Ironton, O.—Commissioners have approved plan of Hanging Rock road submitted to them.

Ironton, O.—County Auditor Crawford has received an estimate for the construction of three state roads proposed for the county as follows: For Hanging Rock, 2.19 miles—Brick, $32,400; concrete, $31,500, and macadam, $20,200. For Chesapeake, 1.06 miles—Concrete, $17,500; macadam, $15,100. For Hecla, 1 mile—Macadam, $12,500.

Sandusky, O.—Bonds amounting to $42,500 are to be issued to defray expenses eliminating grade crossings at Camp St.

Springfield, O.—Sealed proposals will be received until noon, Sept. 5, for the purchase of street improvement bonds amounting to $4,651.99; also bonds amounting to $28,745.78.

Tiffin, O.—Bids for repaving North Washington St. between Water and Harrison Sts. have been rejected as too high and will be readvertised.

Youngstown, O.—East Federal St. is to have the grade raised at an estimated cost of $139,000.

McAlester, Okla.—185 miles of road are proposed and government engineers are making survey on which to base estimates for bond issue.

Eugene, Ore.—Two and a quarter miles of the Pacific highway between Latham and Divide in the southern part of Lane County will be built jointly by the county and the state, according to a contract signed by the members of the county court for the county and W. D. Clark, assistant engineer for the State Highway Commission, for the state. Bids have been called for by county court and engineers of highway commission. According to the estimates filed by County Engineer H. W. Libby for this work there are 4,073 cu. yds. of earth to remove and 7,607 cu. yds. to borrow. There are seven small culverts besides one large concrete culvert to construct.

Carlisle, Pa.—An ordinance has been passed providing for the paving of South Hanover St. and West Pomfret St.

Carlisle, Pa.—An ordinance has been passed providing for the paving with vitrified brick of West Pomfret St. and South Hanover St.

Harrisburg, Pa.—An ordinance has been passed providing for the opening and grading of 27th St. from Derry St. to Greenwood St.

Johnstown, Pa.—Cambria County is advertising for bids on furnishing and applying an approved bituminous material on the surface of the Cresson pike from the Cresson Borough line westward for a distance of approximately one-half mile. The commissioners constructed this road this year, using limestone and limestone screening. The material on which bids are being asked will be used as a binder.

Pittston, Pa.—Blackman and Race Sts. are to be paved soon.

Renovo, Pa.—City council are considering the paving of Huron Ave. from 3d to 8th St.

Williamsport, Pa.—The next step of the Lycoming County Motor Association will be an effort to secure improvement of the road between Williamsport and Elmira, N. Y.

Newport, R. I.—Blodgett & Co. have purchased bonds amounting to $38,500 to be used for sidewalks.

Benton, Tenn.—Self & Co., Dixon Springs, have purchased highway bonds of Polk County amounting to $95,000.

Kingsport, Tenn.—The Kingsport Improvement Co. is receiving bids from contractors on five miles of concrete sidewalks. These walks will be built in the principal business and residential sections of the city. Contractors from Dante, Va., Knoxville, Tenn., and various other points.

Savannah, Tenn.—Road bonds amounting to $100,000 will soon be for sale.

Dallas, Tex.—The paving in Oak Cliff is under consideration.

Fort Worth, Tex.—Commission has been requested to pave Travis Ave. from Lenda St. to Pennsylvania with asphaltic macadam, cost not to exceed $1.25 a square yard.

Centralia, Wash.—A resolution ordering the paving and laying of cement sidewalks on S. Pearl St. between Plum and Walnut Sts. and Plum and Pear Sts. between Pearl St. and Tower Ave., has been passed. Estimated cost is a little over $7,000. A petition has been presented to the commission asking for the paving of 6 St. between 1st and 4th Sts. and 4th St. between J and L Sts., 4 ft. of gravel to be laid along both sides of 8 ft. of hard surface.

Merrill, Wis.—Mill St. from Main St. to First, and First St. from Mill to Scott Sts., and Second St. from Scott to Center Sts. will be paved with brick.

Racine, Wis.—Board of Public Works have been directed to prepare plans and estimates of cost for constructing steps leading from the following street ends: Eleventh St., Ninth St., High St., English St. and Goold St., submitted and estimated the cost as follows: Eleventh St., $100; Ninth St., $84; High St., $84; English St., $70; Goold St., $84.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates Contracts Awarded.)

Berkeley, Cal.—*Johnson Shea & Co., for improvement of Tamalpais, Shasta and Tallac Sts., at about $2.50 per ft.

Porterville, Cal.—*Robert Sherer & Co., for grading 20 miles of roadbed for the Visalia Electric & Southern Pacific companies, electric line through Porterville.

Atlanta, Ga.—Bids received for paving Peachtree St. as follows: Gulf Paving Co., Chattanooga; R. M. Hudson, West Construction Co., Chattanooga; Case & Cothran, Southern Tile & Stone Co., and Jamieson & Hallowell. The street will be paved with wood block between the car tracks, and with either asphalt or bitulithic elsewhere.

Evansville, Ind.—Bids received for paving Howard St. from Van Buren Ave. to Second St. and Riverside Ave. from Ewing St. to the present pavement with Trinidad asphalt as follows: The Western Construction Co., at $1.80 per sq. yd.; Reichert & Stinchfield, at $1.81 per sq. yd.

Greenfield, Ind.—*T. H. New, at $7.45, for new roads in Jackson Twp.

Indianapolis, Ind.—Bids received for paving Washington Blvd. from 43d to 49th Sts., with first grade asphalt, as follows: The Republican Construction Co., $4.17 a lin. ft. for asphalt, and $3.97

a lin. ft. for bituminous concrete. American Construction Co., at $4.50 a lin. ft. for asphalt, and $4.20 a lin. ft. for bituminous concrete.

Kokomo, Ind.—Bids received for improvement of Armstrong St. as follows: J. H. Watson Co., 8c. per foot on sidewalks on the old foundation and 12½c. on a new foundation; curb, 40c. per lin. ft.; pavement, $1.35 per yd.; $4 for removing trees. The Kokomo Asphalt Paving Co., $4,500 for paving with asphalt, walks 20c. per surface ft.; curbs, 40c.

Muncie, Ind.—*Curtis & Curtis, at $16,500, Jester Rd., Center Twp., and Marion Cunningham Rd., Liberty Twp., at $21,950.

South Bend, Ind.—See Sewerage.

Atlantic, Ia.—*G. Mancini, Lincoln, Neb., for paving one mile of road from city limits east, at $1.25 a sq. yd.; total, $75,000.

Dubuque, Ia.—*James Lee Contracting Co., for repaving Wall St., Lexington St. and Wisconsin Ave., at $16,471.

Chanute, Kan.—*Harlan & Denny, for laying concrete walk in Central Park at 13½ cts. per sq. ft. Other bid: Newton Reno at 15 cts. per sq. ft.

Boston, Mass.—*Walter F. Pitts, for grading, drainage, electric conduit and concrete work on Carolina Ave. playground, at $9,878. Other bidders: John McCourt Co., at $12,560.50; George H. Noone, $22,069.50.

Bay City, Mich.—Bids received for construction pavement on Harrison and Water Sts. from Cass Ave. to 28th St., are excessive and have been rejected. City engineer will prepare new specification.

Grand Rapids, Mich.—Bids received for paving a number of streets as follows: Improvement of Market Ave. from Godfrey St. to the section line, estimate of cost $12,258; Richard Pickett, $13,172; Hilding & Rabe, $12,785; Carpenter Construction Co., $12,511. Improvement of Cedar St. from College Ave. to Union Ave., estimate of cost $5,100; Kloote & Sons, $6,069; Richard Pickett, $4,651; Hilding & Rabe, $5,993. Improvement of Jefferson Ave. alley from Island to Wealthy St., estimate of cost, $4,828; Kloote & Son, $4,951; McDormott & Cooper, $4,434; Hilding & Rabe, $5,161; A. Haan, $5,182.

Marquette, Mich.—*Charles Pellissier, for construction 1,270 ft. macadam roadway, at $1.69 per ft., plank curbing at 15c. per ft., ditching 10c. per ft., and 13c. per ft. of 909 ft. of culvert.

Mankato, Minn.—Bids for the laying of cement sidewalks in different parts of the city where new walks are necessary have been received as follows: A. Bashow, 9 and 8 cts. per sq. ft.; Johnson Bros., 11 and 9½ cts. per sq. ft.; Fowler & Pay, 10 and 12 cts. per sq. ft.. *Samuel K. Fowler, 11 and 9 cts. per sq. ft.

Billings, Mont.—Bids received for 25,000 sq. yds. gravel bitulithic pavement on 4-in. concrete foundation, 3,400 cu. yds. excavation as follows: *Warren Construction Co., Portland, Ore., at $64,433.02. Other bidders: Billings Engineering & Construction Co., at $70,006.05; S. Birch & Sons Construction Co., at $67,361.73; Frank Savaresy, at $63,694.95.

Hillside, N. J.—*Lewis Zimmerman, for grading Long Ave. from Broadway to the brook at $1,000.

New Brunswick, N. J.—Bids received for paving the following streets: Commercial Ave., George to Sandford; Carroll Pl.; George from Commercial to Throop; Bayard from George to Railroad; Elm Row; Redmond from Livingston to Lee; Union St.; George from P. R. R. to Hamilton; Spring St.; Burnet from Commerce Sq. to Sonomon's Hill. T. H. Riddle bid $1.77 a sq. yd. for warrenite on all the streets except Commercial Ave., where his bid was $1.92. The Utility Construction Co. bid $1.82 for warrenite on Commercial Ave. and Carroll Pl., and $1.88 on Elm Row. In addition to warrenite Contractor Riddle bid $2.75 a sq. yd. for asphalt block and $2.75 for brick pavement on all the ten streets. The Utility Construction Co. bid $2.85 for brick on George and Spring Sts. Abraham Jelin bid $2.65 for brick on Burnet St.

Newark, N. J.—*A. J. Staknevitch, of Bloomfield, for curbing, guttering and placing sidewalks on Summit Ave. between Parker and Elmwood Aves., at $1,700; *Lepre & Magliaro, of South Orange, at $4,400, for curbing and guttering Wyoming Ave., between the Millburn township line and a point just south of Claremont Ave.

Passaic, N. J.—*Jannarone Construction Co. for macadamizing East Pierrepont Ave. and The Terrace, at $6,805.15.

Syracuse, N. Y.—Bids received for paving Fitch St. as follows: The Warner-Quinlan Asphalt Co., at 87 cts., for modified Topeka and bitulithic concrete, $1.07 for asphalt and $1.50 for vitrified brick or block a sq. yd.

Watervliet, N. Y.—Bids received for raising parts of two roads and a bridge over the site of the new water works dam. The bidders as follows: The Joseph Walker Construction Co., of Albany, $11,953; The John M. Heller Co., of Albany, $14,484, and The E. L. Grimes Construction Co., of Troy, $17,057. Replacing paving block of streets under which the new water mains were laid, to Daniel Knower, whose bid was $2,450.

Canton, Ohio.—Bids have been received for Freeburg road extension in Washington township, New Berlin village, Louisville village, Canal Fulton and Navarre village, as follows: Seiple & Wolfe, Youngstown; Philip Dieffenbacher, Massillon; William Vogt & Sons, Massillon; J. C. Devine, Alliance; Turnbull Bros., Canton; George D. Herring, Mansfield; Hehn Construction Co., Millersburg, and Lee Griggs & Anderson, Millersburg. The date for the awarding of the contracts has not been set.

Cleveland, O.—*Trinidad Paving Co. for paving West Blvd. between Detroit Ave. and Clifton Blvd., at $2,500.

Elyria, O.—*Hart & Kemp, local, for new brick road to be constructed between Ashtabula and Geneva, at $143,710.64.

Fremont, O.—*Highway Improvement Co., for paving Carbon St. at $8,026.35; *Modern Construction Co., for paving Rawson Pl. and Hazel St., at $2,487.45 and $4,575.33, respectively.

Marion, O.—*P. Drake & Son, for paving Pleasant St. from Pearl to Orchard St., at $3,509.54; also Sargent St. from Center St. to Church St., at $4,390.30.

New Paris, O.—*W. E. Jones, for oiling streets within the grounds of the National Soldiers' Home at Dayton, O.

Springfield, O.—*M. J. Hannon for paving Fountain Ave. from Main St. to College Ave., at $40,978.10.

Tiffin, O.—The Modern Construction Co. was the low bidder for the St. Clair St. paving at $3,619.57. Other bid: Geo. Stewart, at $4,266.84. Engineer's estimate, $3,172.78.

Johnstown, Pa.—*J. F. Hochstein, for repaving sidewalks on the Park Pl. and Locust St. sides of Central Park; redressing curb, 15 cts. per ft.; resetting curb, 15 cts. per ft.; laying cement sidewalk, $1.49 per sq. yd. Other bids: Charles Schenkemeyer & Sons, redressing curb, 20 cts. per ft.; resetting curb, 25 cts. per ft.; laying cement sidewalk, $1.70 per sq. yd. Thiele Construction Co., redressing curb, 20 cts. per ft.; resetting curb, 35 cts. per ft.; laying cement sidewalk, $1.50 per sq. yd. William A. Schmidt, redressing curb, 15 cts. per ft.; resetting curb, 20 cts. per ft.; laying cement sidewalk, $1.50 per sq. yd.

Midland, Pa.—*Angela Cupani, for paving Midland Avenue approximately $10,592.

Philadelphia, Pa.—Bids received for repairing highways along the Chestnut Hill division of Pennsylvania R. R., as follows: J. E. Brennenan & Co., at $22,943.50.

Plymouth, Pa.—*Ambler-Davis Co., at approximately $10,000, for the rebuilding of the Germantown pike, between Dekalb St. and Hallowell Ave., Whitpain, a stretch of four-fifths of a mile. Bids received for resurfacing and rebuilding of the Ridge pike, immediately north of Philadelphia, as follows: Donald Mac Neal Co., $95,450; the Union Paving Co. (2-in. concrete base), $124,911, 2½-in. bitumen road on present bed, $74,713; the Ambler-Davis Co., 4-in. concrete, $92,000, 2½-in. bitumen on present bed, $52,200.

Wilkes-Barre, Pa.—*The P. J. Boyle Construction Co. for laying a dry masonry wall with 6 ins. of concrete coping at such place along the Huntsville road as directed by the county engineer at $5 a perch.

Wilkes-Barre, Pa.—*The Herrick Construction Co. for repairing 115 sq. yds. of brick pave on the Breslau approach to the Plymouth bridge at $2.15 a sq. yd.

Providence, R. I.—Commissioner of Public Works Slade was directed by the Board of Contract and Supply yesterday to award the contract for the asphalt paving of Olneyville Sq. to the Narragansett Improvement Co. of this city.

Waterly, R. I.—*F. D. Miller, Norwich, Conn., for cement sidewalks.

Galveston, Tex.—Bids on material for surfacing the East End filling along and near the gulf received as follows, the first figures in each instance representing the price per cubic yard, delivered, and the second the price per cubic yard, delivered and spread: W. P. Moon and B. E. Kahla, $2.10, $2.35; Texas Granitoid Co., $1.28, $1.35; Hibbert & Kelso, $1.26½, $1.39; Frank Freund, $1.17, $1.32; Good Roads Construction Co., $1.17½, $1.25; substitute bids, $1.22½, $1.30.

Portsmouth, Va.—Bids received to construct two miles of road from Nansemond county line to Jeliffs, as follows: O. L. Williams, at about $10,000; other bidders, R. P. Denby and F. J. McGuire.

Bluefield, W. Va.—Bids received for construction of 15,000 sq. yds. bituminous macadam pavement, 4-in. concrete foundation, 1,000 cu. yds. excavation, *R. F. Baker, local, $1.50 per sq. yd. paving, 57 cts. per lin. ft. for curb and gutter.

Spokane, Wash.—*C. M. Payne, for the improvement of Kiernan Ave. between Lidgerwood and Division St., $1,985.

SEWERAGE

Folsom, Cal.—Bonds amounting to $20,000 are to be issued for the construction of a modern sewer system.

Fresno, Cal.—Byrne & McDonnell and R. M. Grant & Co., San Francisco have purchased sewer improvement bonds amounting to $500,000.

Sacramento, Cal.—See Streets and Roads.

Washington, D. C.—See Water Supply.

Arcadia, Fla.—See "Streets and Roads."

Evansville, Ind.—A sewer has been ordered along Bell Ave. from West Indiana St. to the alley between West Indiana and West Illinois St., with branches east 250 ft. and west 370 ft. This sewer is to afford relief to that section from the water flowing from the hills lying west of it.

South Bend, Ind.—A petition for sewers and water connections on West Division St. has been drawn up and signed. Cost of the work is estimated at $17,000.

Tipton, Ind.—Aug. 12, at 10 a. m., by treasurer of Tipton county, for sale, $7,170 ditch bonds, 5 per cent, 5 years. H. C. Haskett, treasurer.

Washington, Ind.—Aug. 15, at 10 a. m., by auditor of Daviess county, for sale, $56,000 ditch bonds, 5 per cent, 10 years. Jacob G. Clark, auditor.

Shreveport, La.—Contracts for construction work and materials for the extension of Shreveport's sanitary sewer system costing $139,944.61, have been awarded. The contracts include four miles of 12-in. cast iron pipe from two sewerage pumping stations to Red River, lead and jute for making unions, construction of the two lines, and the construction of 40 miles of sewers, the pipe for which has already been bought for approximately $29,000.

Boston, Mass.—Commissioner Murphy of the Department of Public Works states his intention to construct sanitary sewer of concrete, 16 lin. ft. 12-in. sanitary sewer and three catch basins and connections in Fulton St., between Richmond and Ferry Sts., estimated cost of $3,749; sanitary sewer of 15-in. earthern pipe, and five catch basins in Clinton St., between Blackstone St. and Merchants row, estimated cost $3,473; sanitary sewer of concrete in Barrett St. from Fulton St. about 100 ft. westerly, estimated cost $1,550.

Haverhill, Mass.—The order for the construction of the Main St. sewer from Willow Ave. along Snow's brook to Primrose St., as originally drawn, will be introduced at the meeting of the city council at its next meeting.

Houghton, Mich.—See "Streets and Roads."

Joplin, Mo.—Albert C. Moore, consulting engineer, has presented the estimate of constructing storm sewer mains to City Council at $196,150. No arrangement has been made for intersecting laterals, which will cost $5,000 or $6,000 more.

Newark, N. J.—An ordinance has been passed providing for the construction of a sanitary sewer in Walton Rd.

Newark, N. J.—Passaic valley sewerage commission will soon advertise for bids for completing the portion of Section No. 2 under New York bay left undone by cancellation of contract with O'Rourke Engineering Construction Co. of New York. About 5,000 ft. remain to be completed.

Woodbridge, N. J.—Township committee has received several petitions for new sewers.